

Service Guide

Colour Television

CHASSIS : CP-005

Model :

DTP-14V1/V2/V3/V5/C3/C4/C5TF

20V1/V3/C4/C5TF

21V1/V2/V4/V6/C6TF



14/20/21 V1



14/21 V2



14/20 V3



21 V4



14 V5



14 C3



14/20 C4



14/20 C5



21 C6

If you need further information (IC, Circuit descriptions or troubleshooting . . .)
about this model, Please visit our web site.(<http://svc.dwe.co.kr>)

■ Specifications

ITEM ITEMS	DTP-14V1TF DTP-14V2TF DTP-14V3TF DTP-14V5TF DTP-14C3TF DTP-14C4TF DTP-14C5TF	DTP-20V1TF DTP-20V3TF DTP-20C4TF DTP-20C5TF	DTP-21V1TF DTP-21V2TF DTP-21V4TF DTP-21V6TF DTP-21C6TF	REMARKS
CCIR STANDARD	BG, D/K, I/I, H, L/L'			
COLOR STANDARD	PAL / SECAM / NTSC(AV only)			
POWER INPUT	AC 230V, 50Hz			
POWER CONSUMPTION	57 W	70 W	73 W	
TUNING SYSTEM	Frequency Synthesizer (FS) Tuning System			
RECEPTION CHANNEL	BAND I : CH2 - CH4 BAND II : CH5 - CH12 CABLE BAND : S1' - S3', S1 - S20 HYPER BAND : S21 - S41 BAND IV, V, VI : CH21 - CH69 (CH 70 for Italy)			
SOUND OUTPUT	3 W			
SPEAKER	3 W 8 ohm			
ANTENNA INPUT IMPEDANCE	75 ohm Unbalanced			
AUXILIARY TETMINAL	INPUT : RCA JACK (Front) SCART JACK (Rear) ——— COMMON			
REMOTE CONTROL	R-40A01			
SPECIAL FUNCTION	14 - Language OSD With TELETEXT Wake-up On Time Sleep Timer			

ITEMS	ITEM	DTP-14V1TF DTP-14V2TF DTP-14V3TF DTP-14V5TF DTP-14C3TF DTP-14C4TF DTP-14C5TF DTP-14M5TF	DTP-20V1TF DTP-20V3TF DTP-20C4TF DTP-20C5TF	DTP-21V1TF DTP-21V2TF DTP-21V4TF DTP-21V6TF DTP-21C6TF	REMARKS
CCIR STANDARD		BG, D/K, I/I, H,L/L'			
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ANTENNA INPUT IMPEDANCE		75 ohm Unbalanced			
AUXILIARY TERMINAL		INPUT : RCA JACK (Front) SCART JACK (Rear) ┌─ COMMON			
INTERMEDIATE FREQUENCIES		PIF : 38.9MHz (B/G,D/K,I,L), 33.9MHz (L') SIF : 33.4MHz (PAL/SECAM-B/G) 32.9MHz (PAL/SECAM-I/I) 32.4MHz (PAL/SECAM-D/K, SECAM-L) 40.4MHz (SECAM-L') SOUND SUBCARRIER : 5.5MHz (PAL/SECAM-B/G) 6.0MHz (PAL/SECAM-I/I) 6.5MHz (PAL/SECAM-D/K, SECAM-L) 6.5MHz (SECAM-L') COLOR SUBCARRIER : 4.43MHz (PAL) 4.250MHz, 4.406MHz (SECAM)			
REMOTE CONTROL		R-40A01			
SPECIAL FUNCTIONS		14-Language OSD With TELETEXT Wake-up On Time Sleep Timer			

PRODUCT SAFETY SERVICING GUIDELINES FOR AUDIO - VIDEO PRODUCTS

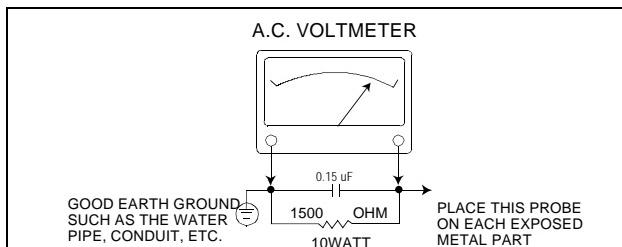
CAUTION : DO NOT ATTEMPT TO MODIFY THIS PRODUCT IN ANY WAY. NEVER PERFORM CUSTOMIZED INSTALLATIONS WITHOUT MANUFACTURER'S APPROVAL. UNAUTHORIZED MODIFICATIONS WILL NOT ONLY VOID THE WARRANTY, BUT MAY LEAD TO YOUR BEING LIABLE FOR ANY RESULTING PROPERTY DAMAGE OR USER INJURY. SERVICE WORK SHOULD BE PERFORMED ONLY AFTER YOU ARE THOROUGHLY FAMILIAR WITH ALL OF THE FOLLOWING SAFETY CHECKS AND SERVICING GUIDELINES. TO DO OTHERWISE, INCREASES THE RISK OF POTENTIAL HAZARDS AND INJURY TO THE USER. WHILE SERVICING, USE AN ISOLATION TRANSFORMER FOR PROTECTION FROM A.C. LINE SHOCK.

SAFETY CHECKS

AFTER THE ORIGINAL SERVICE PROBLEM HAS BEEN CORRECTED, A CHECK SHOULD BE MADE OF THE FOLLOWING:

SUBJECT: FIRE & SHOCK HAZARD

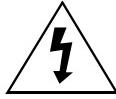
1. BE SURE THAT ALL COMPONENTS ARE POSITIONED IN SUCH A WAY AS TO AVOID POSSIBILITY OF ADJACENT COMPONENT SHORTS. THIS IS ESPECIALLY IMPORTANT ON THOSE MODULES WHICH ARE TRANSPORTED TO AND FROM THE REPAIR SHOP.
2. NEVER RELEASE A REPAIR UNLESS ALL PROTECTIVE DEVICES SUCH AS INSULATORS, BARRIERS, COVERS, SHIELDS, STRAIN RELIEFS, POWER SUPPLY CORDS, AND OTHER HARDWARE HAVE BEEN REINSTALLED PER ORIGINAL DESIGN. BE SURE, THAT THE SAFETY PURPOSE OF THE POLARIZED LINE PLUG HAS NOT BEEN DEFEATED.
3. SOLDER MUST BE INSPECTED TO DISCOVER POSSIBLE COLD SOLDER JOINTS, SOLDER SPLASHES OF SHARP SOLDER POINTS. BE CERTAIN TO REMOVE ALL LOOSE FOREIGN PARTICLES.
4. CHECK FOR PHYSICAL EVIDENCE OF DAMAGE OR DETERIORATION TO PARTS AND COMPONENTS, FOR FRAYED LEADS, DAMAGED INSULATION (INCLUDING A.C. CORD), AND REPLACE IF NECESSARY. FOLLOW ORIGINAL LAYOUT, LEAD LENGTH AND DRESS.
5. NO LEAD OR COMPONENT SHOULD TOUCH A RECEIVING TUBE OR A RESISTOR RATED AT 1 WATT OR MORE. LEAD TENSION AROUND PROTRUDING METAL SURFACES MUST BE AVOIDED.
6. ALL CRITICAL COMPONENTS SUCH AS FUSES, FLAMEPROOF RESISTOR, CAPACITORS, ETC. MUST BE REPLACED WITH EXACT FACTORY TYPES. DO NOT USE REPLACEMENT COMPONENTS OTHER THAN THOSE SPECIFIED OR MAKE UNRECOMMENDED CIRCUIT MODIFICATIONS.
7. AFTER RE-ASSEMBLY OF THE SET ALWAYS PERFORM AN A.C. LEAKAGE TEST ON ALL EXPOSED METALLIC PARTS OF THE CABINET. (THE CHANNEL SELECTOR KNOB, ANTENNA TERMINALS, HANDLE AND SCREWS) TO BE SURE THE SET IS SAFE TO OPERATE WITHOUT DANGER OF ELECTRICAL SHOCK. DO NOT USE A LINE ISOLATION TRANSFORMER DURING THIS TEST USE AN A.C. VOLTMETER, HAVING 5000 OHMS PER VOLT OR MORE SENSITIVITY, IN THE FOLLOWING MANNER: CONNECT A 1500 OHM 10 WATT RESISTOR, PARALLELED BY A .15 MFD. 150V A.C. TYPE CAPACITOR BETWEEN A KNOWN GOOD EARTH GROUND (WATER PIPE, CONDUIT, ETC.) AND THE EXPOSED METALLIC PARTS, ONE AT A TIME. MEASURE THE A.C. VOLTAGE ACROSS THE COMBINATION OF 1500 OHM RESISTOR AND .15 MFD CAPACITOR. REVERSE THE A.C. PLUG AND REPEAT A.C. VOLTAGE MEASUREMENTS FOR EACH EXPOSED METALLIC PART. VOLTAGE MEASURED MUST NOT EXCEED .75 VOLTS R.M.S THIS CORRESPONDS TO 0.5 MILLIAMP A.C. ANY VALUE EXCEEDING THIS LIMIT CONSTITUTES A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED IMMEDIATELY.



SUBJECT : GRAPHIC SYMBOLS



THE LIGHTNING FLASH WITH ARROWHEAD SYMBOL, WITHIN AN EQUILATERAL TRIANGLE, IS INTENDED TO ALERT THE SERVICE PERSONNEL TO THE PRESENCE OF UNINSULATED "DANGEROUS VOLTAGE" THAT MAY BE OF SUFFICIENT MAGNITUDE TO CONSTITUTE A RISK OF ELECTRIC SHOCK.



THE EXCLAMATION POINT WITHIN AN EQUILATERAL TRIANGLE IS INTENDED TO ALERT THE SERVICE PERSONNEL TO THE PRESENCE OF IMPORTANT SAFETY INFORMATION ON SERVICE LITERATURE.

SUBJECT : X-RADIATION

1. BE SURE PROCEDURES AND INSTRUCTIONS TO ALL SERVICE PERSONNEL COVER THE SUBJECT OF X-RADIATION. THE ONLY POTENTIAL SOURCE OF X-RAYS IN CURRENT T.V. RECEIVERS IS THE PICTURE TUBE HOWEVER, THIS TUBE DOES NOT EMIT X-RAYS WHEN THE HIGH VOLTAGE IS AT THE FACTORY SPECIFIED LEVEL. THE PROPER VALUE IS GIVEN IN THE APPLICABLE SCHEMATIC. OPERATION AT HIGHER VOLTAGES MAY CAUSE A FAILURE OF THE PICTURE TUBE OR HIGH VOLTAGE SUPPLY AND UNDER CERTAIN CIRCUMSTANCES, AMY PRODUCE RADIATION IN EXCESS OF DESIRABLE LEVELS.
2. ONLY FACTORY SPECIFIED C.R.T ANODE CONNECTORS MUST BE USED. DEGAUSSING SHIELDS ALSO SERVE AS X-RAY SHIELD IN COLOR SETS. ALWAYS RE-INSTALL THEM.
3. IT IS ESSENTIAL THAT SERVICE PERSONNEL HAVE AVAILABLE AN ACCURATE AND RELIABLE HIGH VOLTAGE METER. THE CALIBRATION OF THE METER SHOULD BE CHECKED PERIODICALLY AGAINST A REFERENCE STANDARD, SUCH AS THE ONE AVAILABLE AT YOUR DISTRIBUTOR.
4. WHEN THE HIGH VOLTAGE CIRCUITRY IS OPERATING PROPERLY THERE IS NO POSSIBILITY OF AN X-RADIATION PROBLEM. EVERY TIME A COLOR CHASSIS IS SERVICED, THE BRIGHTNESS SHOULD BE RUN UP AND DOWN WHILE MONITORING THE HIGH VOLTAGE WITH A METER TO BE CERTAIN THAT THE HIGH VOLTAGE DOES NOT EXCEED THE SPECIFIED VALUE AND THAT IT IS REGULATING CORRECTLY. WE SUGGEST THAT YOU AND YOUR SERVICE ORGANIZATION REVIEW TEST PROCEDURES SO THAT VOLTAGE REGULATION IS ALWAYS CHECKED AS A STANDARD SERVICING PROCEDURE, AND THAT THE HIGH VOLTAGE READING BE RECORDED ON EACH CUSTOMER'S INVOICE.
5. WHEN TROUBLESHOOTING AND MAKING TEST MEASUREMENTS IN A PRODUCT WITH A PROBLEM OF EXCESSIVE HIGH VOLTAGE, AVOID BEING UNNECESSARILY CLOSE TO THE PICTURE TUBE AND THE HIGH VOLTAGE SUPPLY. DO NOT OPERATE THE PRODUCT LONGER THAN IS NECESSARY TO LOCATE THE CAUSE OF EXCESSIVE VOLTAGE.
6. REFER TO HV, B+ AND SHUTDOWN ADJUSTMENT PROCEDURES DESCRIBED IN THE APPROPRIATE SCHEMATIC AND DIAGRAMS (WHERE USED).

SUBJECT : IMPLOSION

1. ALL DIRECT VIEWED PICTURE TUBES ARE EQUIPPED WITH AN INTEGRA IMPLOSION PROTECTION SYSTEM. BUT CARE SHOULD BE TAKEN TO AVOID DAMAGE DURING INSTALLATION. AVOID SCRATCHING THE TUBE. OF SCRATCHED REPLACE IT.
2. USE ONLY RECOMMENDED FACTORY REPLACEMENT TUBES.

SUBJECT : TIPS ON PROPER INSTALLATION

1. NEVER INSTALL ANY PRODUCT IN A CLOSED-IN RECESS, CUBBYHOLE OR CLOSELY FITTING SHELF SPACE, OVER OR CLOSE TO HEAT DUCT, OR IN THE PATH OF HEATED AIR FLOW.
2. AVOID CONDITIONS OF HIGH HUMIDITY SUCH AS: OUTDOOR PATIO INSTALLATIONS WHERE DEW IS A FACTOR, NEAR STEAM RADIATORS WHERE STEAM LEAKAGE IS A FACTOR, ETC.
3. AVOID PLACEMENT WHERE DRAPERY MAY OBSTRUCT REAR VENTING. THE CUSTOMER SHOULD ALSO AVOID THE USE OF DECORATIVE SCARVES OR OTHER COVERINGS WHICH MIGHT OBSTRUCT VENTILATION.
4. WALL AND SHELF MOUNTED INSTALLATIONS USING A COMMERCIAL MOUNTING KIT, MUST FOLLOW THE FACTORY APPROVED MOUNTING INSTRUCTIONS. A PRODUCT MOUNTED TO A SHELF OR PLATFORM MUST RETAIN ITS ORIGINAL FEET (OR THE EQUIVALENT THICKNESS IN SPACERS) TO PROVIDE ADEQUATE AIR FLOW ACROSS THE BOTTOM. BOLTS OR SCREWS USED FOR FASTENERS MUST NOT TOUCH ANY PARTS OR WIRING. PERFORM LEAKAGE TEST ON CUSTOMIZED INSTALLATIONS.
5. CAUTION CUSTOMERS AGAINST THE MOUNTING OF A PRODUCT ON SLOPING SHELF OR A TILTED POSITION, UNLESS THE PRODUCT IS PROPERLY SECURED.
6. A PRODUCT ON A ROLL-ABOUT CART SHOULD BE STABLE ON ITS MOUNTING TO THE CART. CAUTION THE CUSTOMER ON THE HAZARDS OF TRYING TO ROLL A CART WITH SMALL CASTERS ACROSS THRESHOLDS OR DEEP PILE CARPETS.
7. CAUTION CUSTOMERS AGAINST THE USE OF A CART OR STAND WHICH HAS NOT BEEN LISTED BY UNDERWRITERS LABORATORIES, INC. FOR USE WITH THEIR SPECIFIC MODEL OF TELEVISION RECEIVER OR GENERICALLY APPROVED FOR USE WITH T.V.S OF THE SAME OR LARGER SCREEN SIZE.
8. CAUTION CUSTOMERS AGAINST THE USE OF EXTENSION CORDS, EXPLAIN THAT A FOREST OF EXTENSIONS SPROUTING FROM A SINGLE OUTLET CAN LEAD TO DISASTROUS CONSEQUENCES TO HOME AND FAMILY.

PRODUCT SAFETY SERVICING GUIDELINES FOR COLOR TELEVISION RECEIVERS

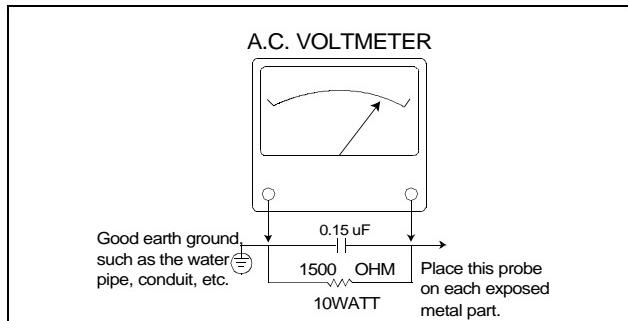
CAUTION : Do not attempt to modify this product in any way. Unauthorized modifications will not only void the warranty, but may lead to your being liable for any resulting property damage or user injury. Service work should be performed only after you are thoroughly familiar with all of the following safety checks and servicing guidelines. To do otherwise, increases the risk of potential hazards and injury to the user.

SAFETY CHECKS

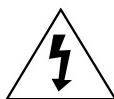
After the original service problem has been corrected, a check should be made of the following:

SUBJECT : FIRE & SHOCK HAZARD

1. Be sure that all components are positioned in such a way as to avoid possibility of adjacent component shorts. This is especially important on those chassis which are transported to and from the repair shop.
2. Never release a repair unless all protective devices such as insulators, barriers, covers, shields, strain reliefs, and other hardware have been reinstalled per original design.
3. Soldering must be inspected to discover possible cold solder joints, frayed leads, damaged insulation (including A.C. cord), solder splashes or sharp solder points. Be certain to remove all loose foreign particals.
4. Check for physical evidence of damage or deterioration to parts and components, and replace if necessary follow original layout, lead length and dress.
5. No leads or components should touch a receiving tube or a resistor rated at 1 watt or more. Lead tension around protruding metal surfaces must be avoided.
6. All critical components such as fuses, flameproof resistors, capacitors, etc. must be replaced with exact factory types. Do not use replacement components other than those specified or make unrecommended circuit modifications.
7. After re-assembly of the set always perform an A.C. leakage test on all exposed metallic parts of the cabinet, (the channel selector knob, antenna terminals, handle and screws) to be sure the set is safe to operate without danger of electrical shock. Do not use a line isolation transformer during this test. Use an A.C. voltmeter, having 5000 ohms per volt or more sensitivity, in the following manner : connect a 1500 ohm 10 watt resistor, paralleled by a 15 mfd. 150V A.C. type capacitor between a known good earth ground (water pipe, conduit, etc.) and the exposed metallic parts, one at a time. Measure the A.C. voltage across the combination of 1500 ohm resistor and 0.15 MFD capacitor. Reverse the A.C. plug and repeat A.C. voltage measurements for each exposed metallic part. Voltage measured must not exceed 0.75 volts R.M.S. This corresponds to 0.5 milliamp A.C. Any value exceeding this limit constitutes a potential shock hazard and must be corrected immediately.



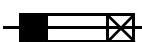
GRAPHIC SYMBOLS :



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the service personnel to the presence of uninsulated "dangerous voltage" that may be of sufficient magnitude to constitute a risk of electric shock.



The exclamation point within an equilateral triangle is intended to alert the service personnel to the presence of important safety information in service literature.



Fuse symbol is printed on pcb adjacent to the fuse, with "RISK OF FIRE REPLACE FUSE AS MARKED". The symbol is explained in the service manual with the following wording or equivalent.

"CAUTION : FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH SAME TYPE (4A, 125V)" and "ATTENTION: AFIN D'ASSU UNE PROTECTION PERMANENTE CONTRE LES RISQUES D'INCENDIE, REMPLACER UNIQUEMENT PAR UN FUSIBLE DE MEME TYPE ET DE "4A, 125V".

SUBJECT : X-RADIATION

1. Be sure procedures and instructions to all service personnel cover the subject of X-rays in current T.V. receivers is the picture tube. However, this tube does not emit X-rays when the high voltage is at the factory specified level. The proper value is given in the applicable schematic. Operation at higher voltages may cause a failure of the picture tube or high voltage supply and, under certain circumstances, may produce radiation in excess of desirable levels.
2. Only factory specified C.R.T. anode connectors must be used. Degaussing shields also serve as X-ray shield in color sets. Always re-install them.
3. It is essential that the serviceman has available an accurate and reliable high voltage meter. The calibration of the meter should be checked periodically against a reference standard. Such as the one available at your distributor.
4. When the high voltage circuitry is operating properly there is no possibility of an X-radiation problem. Every time a color chassis is serviced, the brightness should be run up and down while monitoring the high voltage with a meter to be certain that the high voltage does not exceed the specified value and that it is regulating correctly. We suggest that you and your service organization review test procedures so that voltage regulation is always checked as a standard servicing procedure. And that the high voltage reading be recorded on each customer's invoice.
5. When troubleshooting and making test measurements in a receiver with a problem of excessive high voltage, avoid being unnecessarily close to the picture tube and the high voltage compartment. Do not operate the chassis longer than is necessary to locate the cause of excessive voltage.
6. Refer to HV, B+and Shutdown adjustment procedures described in the appropriate schematic and diagrams(where used).

SUBJECT : IMPLOSION

1. All direct viewed picture tubes are equipped with an integral implosion protection system, but care should be taken to avoid damage during installation. Avoid scratching the tube. If scratched, replace it.
2. Use only recommended factory replacement tubes.

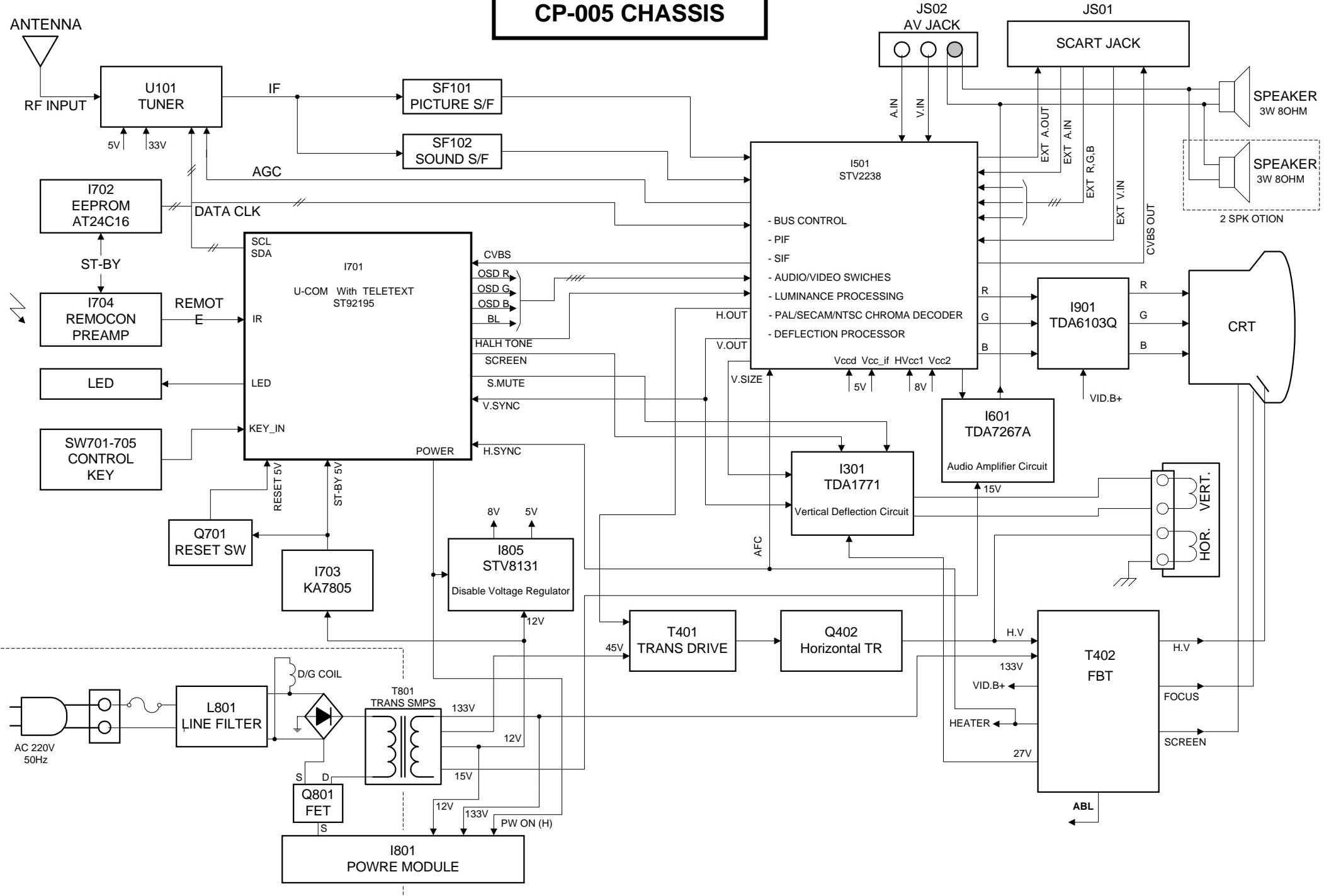
SUBJECT : TIPS ON PROPER INSTALLATION

1. Never install any receiver in closed-in recess, cubbyhole or closely fitting shelf space over, or close to heat duct, or in the path of heated air flow.
2. Avoid conditions of high humidity such as : Outdoor patio installations where dew is a factor. Near steam radiators where steam leakage is a factor, etc.
3. Avoid placement where draperies may obstruct rear venting. The customer should also avoid the use of decorative scarves or other coverings which might obstruct ventilation.

4. Wall and shelf mounted installations using a commercial mounting kit, must follow the factory approved mounting instructions. A receiver mounted to a shelf or platform must retain its original feet(or the equivalent thickness in spacers) to provide adequate air flow across the bottom, bolts or screws used for fasteners must not touch any parts or wiring. Perform leakage test on customized installations.

5. Caution customers against the mounting of a receiver on sloping shelf or a tilted position, unless the receiver is properly secured.
6. A receiver on a roll-about cart should be stable on its mounting to the cart. Caution the customer on the hazards of trying to roll a cart with small casters across thresholds or deep pile carpets.
7. Caution customers against the use of a cart or stand which has not been listed by underwriters laboratories, inc. For use with their specific model of television receiver or generically approved for use with T.V.'s of the same or larger screen size.

CP-005 CHASSIS



■ Alignment Instructions

SVC v1	
R BIAS	159
G BIAS	136
B BIAS	127
R DRIVE	35
G DRIVE	31
B DRIVE	32
V. CENTER	10
V. SIZE	23
H. CENTER	28
VCO	07
VCO FIN	107
VCO-L	05
VCO-L FIN	113
AGC	44
LED EAST	NO
Pr	01
Remocon	J

ENTER SERVICE MODE

1. Select the Pr 91.
2. Adjust "Sparseness" to 0.
3. Enter the service mode using the following keys.
R → G → MENU.

1. AFT

1) Set a Signal Generator with

- RF FREQUENCY = 38.9MHz, 34.2MHz (L')
- RF OUTPUT LEVEL = 80 ± 5 dBuV
- System = PAL for 38.9MHz.

SECAM-I for 43.2MHz

2) Connect the Signal Generator RF Output(PAL 38.9MHz) to P101 (Tuner IF Output).

There must be no signal input to the tuner.

3) Locate the cursor to "VCO" in Service Mode Menu, then press the "Vol +" key and wait until the "Please wait" disappear on the TV screen.

4) Connect the Signal Generator RF Output(SECAM-L 34.2MHz) to P101 (Tuner IF Output).

5) Locate the cursor to "VCO-L" in Service Mode Menu, then press the "Vol +" key and wait until the "Please wait" disappear on the TV screen.

2. SCREEN

- 1) Receive the Retma pattern and heat run over 15 minutes.**
- 2) Adjust the “R, G BIAS, R, G DRIVE” to 0, “B BIAS” to 127, “B DRIVE” to 32.
Adjust the screen volume that the Retma pattern reach to the cut-off point.**

3. WHITE BALANCE

- 1) Receive the Full white pattern and heat run over 15 minutes.**
- 2) Adjust the picture control at the point “Y” value of white balance instrument in 20cd/m^2 .**
- 3) Enter the service mode.**
- 4) Adjust “R BIAS, G BIAS” to $x=288$, $y=301$.**
- 5) In order to exit the service mode power off the TV set and power on.**
- 6) Set the TV set to “Normal I” mode(20/21 inch) or set to
“Normal II” mode(14 inch)**
- 7) Enter the service mode.**
- 8) Adjust “R DRIVE, G DRIVE” to $x=288$, $y=301$.**
- 9) Repeat above process until the white balance value to $x=288$, $y=301$, $Y=20$,
 $x=288$, $y=301$, $Y=200$ (approximate) in 2 – 8).**

4. FOCUS

- 1) Apply a RETMA PATTERN signal.**
- 2) Adjust the Focus Volume on FBT to obtain optimal resolution.**

5. AGC

- 1) Set the pattern Generator with**
 - RF LEVEL = 60dBuV
 - 100% FULL COLOR BAR
- 2) Connect the pattern generator RF output to tuner RF input.**
- 3) Connect the probe of oscilloscope in AGC pin of tuner.**
- 4) Adjust the AGC point to MAX – 1V.**

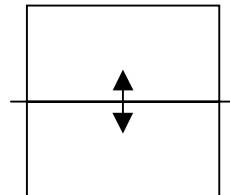
(Simple Method)

- 1) Receive the pattern.**
- 2) Locate the cursor in “AGC” and adjust using the “VOL +” or “VOL -“ keys.**
- 3) Adjust the point there is no noise in about 60dBuV and no beat in about 90dBuV .**

6. GEOMETRY

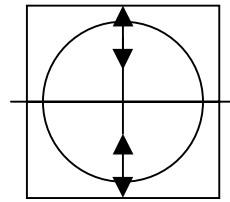
6.1 VERTICAL CENTER

- 1) Set the TV to “NORMAL I” mode.
- 2) Enter the service mode.
- 3) Locate the cursor at “V. CENTER” then press “VOL +” or “VOL –“ keys to adjust the center line with the mechanical center marks of the CRT.



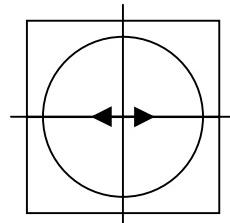
6.2 VERTICAL SIZE

- * The VERTICAL CENTER adjustment has to be done in advance.
- 1) Receive the Retma pattern.
 - 2) Set the TV to “NORAML I” mode.
 - 3) Enter the service mode.
 - 4) Locate the cursor at “V. SIZE” then press “VOL +” or VOL –“ keys to adjust the upper part of the picture.



6.3 HORIZONTAL CENTER

- 1) Apply a RETMA PATTERN signal.
- 2) Set the TV to “NORMAL I” mode.
- 3) Enter the service mode.
- 4) Locate the cursor at “H. CENTER” then press “VOL +” or VOL –“ keys to adjust the picture centering.



If EEPROM(I702) has been changed ;

- Option data has to be changed and
- all alignment function has to be readjusted.

* The initial state of adjustment are as follows ;

- V-Center, V-Size, H-Center, R, G, B, AFT = Center ()
- AGC =

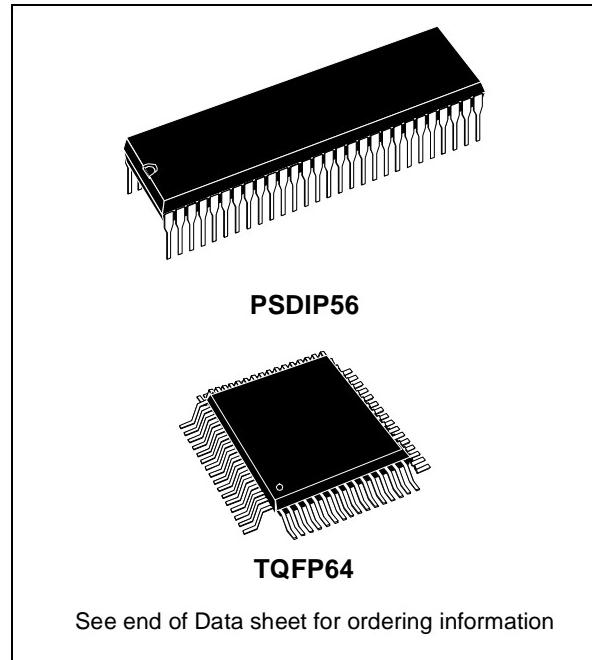
* Service Remocon



ST92195B

32-64K ROM HCMOS MCU WITH ON-SCREEN-DISPLAY AND TELETEXT DATA SLICER

- Register File based 8/16 bit Core Architecture with RUN, WFI, SLOW and HALT modes
- 0°C to +70°C operating temperature range
- Up to 24 MHz. operation @ 5V±10%
- Min. instruction cycle time: 165ns at 24 MHz.
- 32, 48, 56 or 64 Kbytes ROM
- 256 bytes RAM of Register file (accumulators or index registers)
- 256 bytes of on-chip static RAM
- 2, 6 or 8 Kbytes of TDSRAM (Teletext and Display Storage RAM)
- 28 fully programmable I/O pins
- Serial Peripheral Interface
- Flexible Clock controller for OSD, Data Slicer and Core clocks running from a single low frequency external crystal.
- Enhanced display controller with 26 rows of 40/80 characters
 - Serial and Parallel attributes
 - 10x10 dot matrix, 512 ROM characters, definable by user
 - 4/3 and 16/9 supported in 50/60Hz and 100/120 Hz mode
 - Rounding, fringe, double width, double height, scrolling, cursor, full background color, half-intensity color, translucency and half-tone modes
- Teletext unit, including Data Slicer, Acquisition Unit and up to 8 Kbytes RAM for data storage
- VPS and Wide Screen Signalling slicer (on some devices)
- Integrated Sync Extractor and Sync Controller
- 14-bit Voltage Synthesis for tuning reference voltage
- Up to 6 external interrupts plus one Non-Maskable Interrupt
- 8 x 8-bit programmable PWM outputs with 5V open-drain or push-pull capability
- 16-bit watchdog timer with 8-bit prescaler
- One 16-bit standard timer with 8-bit prescaler
- 4-channel A/D converter; 6-bit guaranteed



See end of Data sheet for ordering information

- Rich instruction set and 14 addressing modes
- Versatile development tools, including Assembler, Linker, C-compiler, Archiver, Source Level Debugger and hardware emulators with Real-Time Operating System available from third parties
- Pin-compatible EPROM and OTP devices available

Device Summary

Device	Program Memory	TDS RAM	VPS/ WSS	Package
ST92195B1	32K ROM	2K	Yes	PSDIP56/ TQFP64
ST92195B2	32K ROM	6K	No	
ST92195B3	32K ROM	6K	Yes	
ST92195B4	48K ROM	6K	Yes	
ST92195B5	48K ROM	8K	Yes	
ST92195B6	56K ROM	8K	Yes	
ST92195B7	64K ROM	8K	Yes	
ST92T195B7	64K OTP	8K	Yes	CSDIP56 /CQFP64
ST92E195B7	64K OTP	8K	Yes	

Rev. 2.2

1 GENERAL INFORMATION

1.1 INTRODUCTION

The ST92195 microcontroller is developed and manufactured by STMicroelectronics using a proprietary n-well HCMOS process. Its performance derives from the use of a flexible 256-register programming model for ultra-fast context switching and real-time event response. The intelligent on-chip peripherals offload the ST9 core from I/O and data management processing tasks allowing critical application tasks to get the maximum use of core resources. The ST92195 MCU supports low power consumption and low voltage operation for power-efficient and low-cost embedded systems.

1.1.1 ST9+ Core

The advanced Core consists of the Central Processing Unit (CPU), the Register File and the Interrupt controller.

The general-purpose registers can be used as accumulators, index registers, or address pointers. Adjacent register pairs make up 16-bit registers for addressing or 16-bit processing. Although the ST9 has an 8-bit ALU, the chip handles 16-bit operations, including arithmetic, loads/stores, and memory/register and memory/memory exchanges.

Two basic addressable spaces are available: the Memory space and the Register File, which includes the control and status registers of the on-chip peripherals.

1.1.2 Power Saving Modes

To optimize performance versus power consumption, a range of operating modes can be dynamically selected.

Run Mode. This is the full speed execution mode with CPU and peripherals running at the maximum clock speed delivered by the Phase Locked Loop (PLL) of the Clock Control Unit (CCU).

Wait For Interrupt Mode. The Wait For Interrupt (WFI) instruction suspends program execution until an interrupt request is acknowledged. During WFI, the CPU clock is halted while the peripheral and interrupt controller keep running at a frequen-

cy programmable via the CCU. In this mode, the power consumption of the device can be reduced by more than 95% (Low power WFI).

Halt Mode. When executing the HALT instruction, and if the Watchdog is not enabled, the CPU and its peripherals stop operation and the I/O ports enter high impedance mode. A reset is necessary to exit from Halt mode.

1.1.3 I/O Ports

Up to 28 I/O lines are dedicated to digital Input/Output. These lines are grouped into up to five I/O Ports and can be configured on a bit basis under software control to provide timing, status signals, timer and output, analog inputs, external interrupts and serial or parallel I/O.

1.1.4 TV Peripherals

A set of on-chip peripherals form a complete system for TV set and VCR applications:

- Voltage Synthesis
- VPS/WSS Slicer
- Teletext Slicer
- Teletext Display RAM
- OSD

1.1.5 On Screen Display

The human interface is provided by the On Screen Display module, this can produce up to 26 lines of up to 80 characters from a ROM defined 512 character set. The character resolution is 10x10 dot. Four character sizes are supported. Serial attributes allow the user to select foreground and background colors, character size and fringe background. Parallel attributes can be used to select additional foreground and background colors and underline on a character basis.

1.1.6 Teletext and Display Storage RAM

The internal Teletext and Display storage RAM can be used to store Teletext pages as well as Display parameters.

GENERAL DESCRIPTION (Cont'd)

1.1.7 Teletext, VPS and WSS Data Slicers

The three on-board data slicers using a single external crystal are used to extract the Teletext, VPS and WSS information from the video signal. Hardware Hamming decoding is provided.

1.1.8 Voltage Synthesis Tuning Control

14-bit Voltage Synthesis using the PWM (Pulse Width Modulation)/BRM (Bit Rate Modulation) technique can be used to generate tuning voltages for TV set applications. The tuning voltage is output on one of two separate output pins.

1.1.9 PWM Output

Control of TV settings can be made with up to eight 8-bit PWM outputs, with a maximum frequency of 23,437Hz at 8-bit resolution (INTCLK = 12 MHz). Low resolutions with higher frequency operation can be programmed.

1.1.10 Serial Peripheral Interface (SPI)

The SPI bus is used to communicate with external devices via the SPI, or I²C bus communication standards. The SPI uses a single data line for data input and output. A second line is used for a synchronous clock signal.

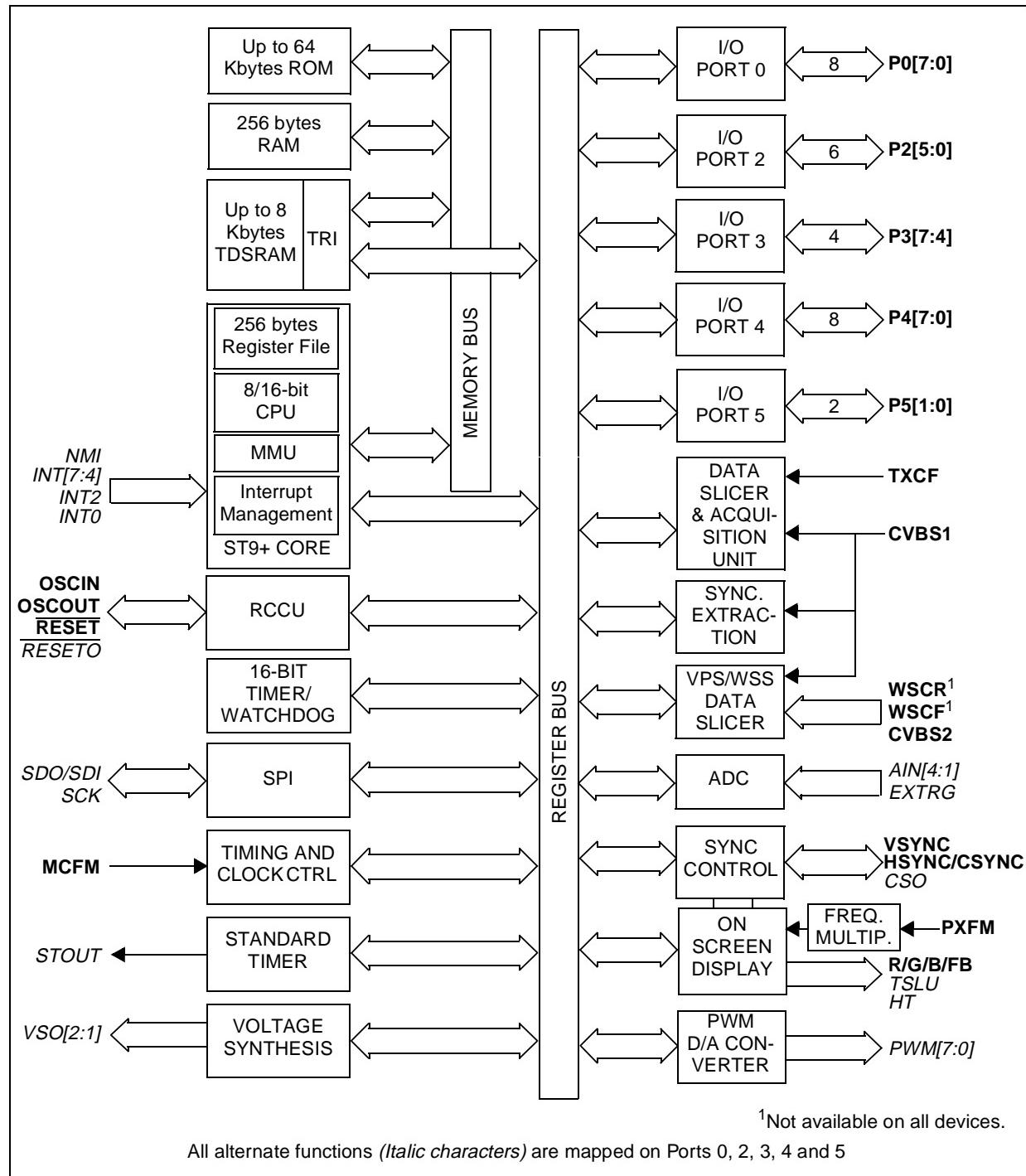
1.1.11 Standard Timer (STIM)

The ST92195 has one Standard Timer that includes a programmable 16-bit down counter and an associated 8-bit prescaler with Single and Continuous counting modes.

1.1.12 Analog/Digital Converter (ADC)

In addition there is a 4-channel Analog to Digital Converter with integral sample and hold, fast 5.75μs conversion time and 6-bit guaranteed resolution.

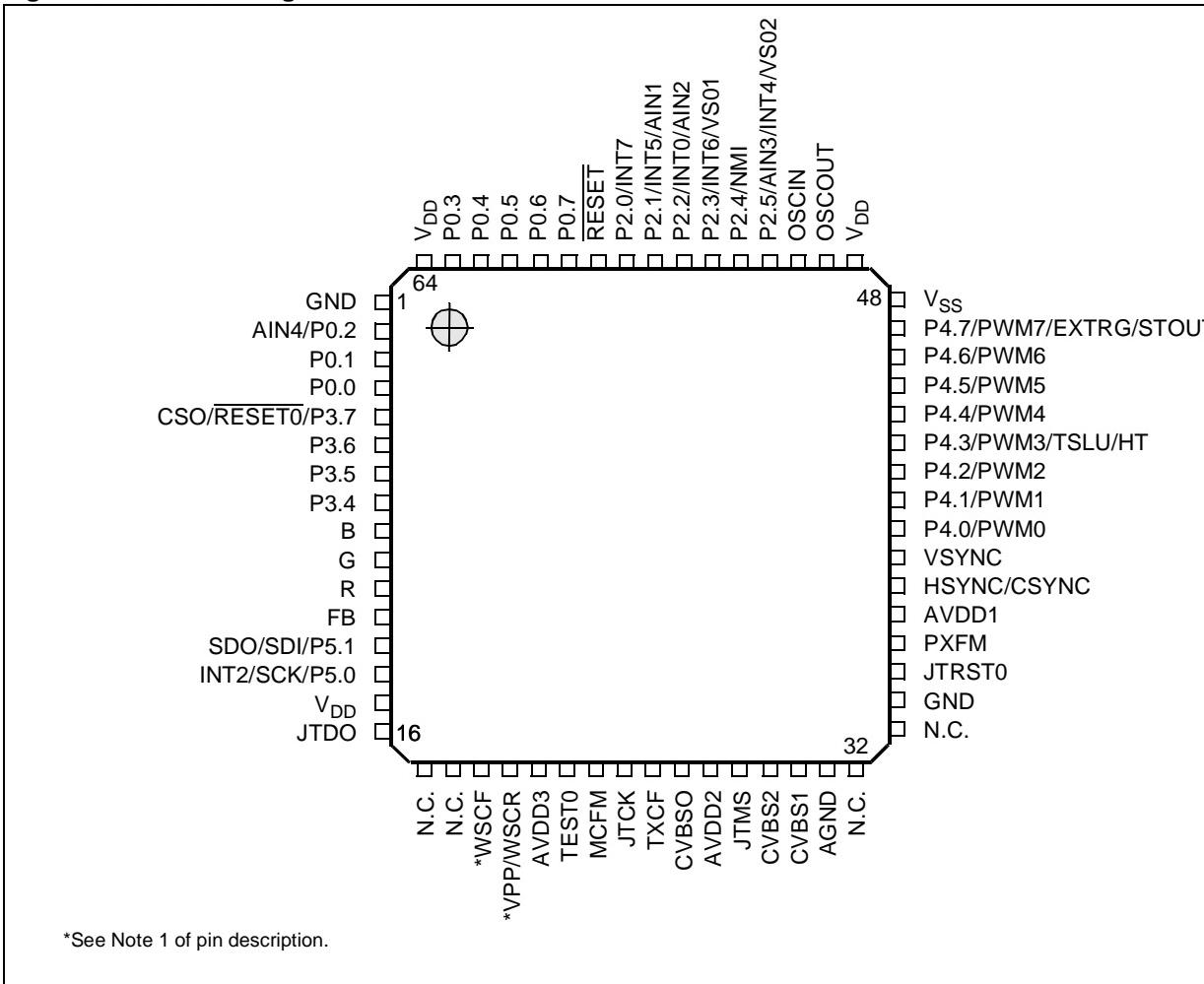
Figure 1. ST92195 Block Diagram



ST92195B - GENERAL INFORMATION

1.2 PIN DESCRIPTION

Figure 2. 64-Pin Package Pin-Out



N.C. = Not connected

PIN DESCRIPTION (Cont'd)

RESET Reset (input, active low). The ST9+ is initialised by the Reset signal. With the deactivation of RESET, program execution begins from the Program memory location pointed to by the vector contained in program memory locations 00h and 01h.

R/G/B Red/Green/Blue. Video color analog DAC outputs.

FB Fast Blanking. Video analog DAC output.

VDD Main power supply voltage (5V10%, digital)

WSCF, WSCR Analog pins for the VPS/WSS slicer line PLL (See note 1).

MCFM Analog pin for the display pixel frequency multiplier.

OSCIN, OSCOUT Oscillator (input and output). These pins connect a parallel-resonant crystal (24MHz maximum), or an external source to the on-chip clock oscillator and buffer. OSCIN is the input of the oscillator inverter and internal clock generator; OSCOUT is the output of the oscillator inverter.

VSYNC Vertical Sync. Vertical video synchronisation input to OSD. Positive or negative polarity.

H SYNC/C SYNC Horizontal/Composite sync. Horizontal or composite video synchronisation input to OSD. Positive or negative polarity.

PXFM Analog pin for the Display Pixel Frequency Multiplier

AVDD3 Analog VDD of PLL. This pin must be tied to VDD externally to the ST92195.

GND Digital circuit ground.

AGND Analog circuit ground (must be tied externally to digital GND).

CVBS1 Composite video input signal for the Teletext slicer and sync extraction.

CVBS2 Composite video input signal for the VPS/WSS slicer. Pin AC coupled.

AVDD1, AVDD2 Analog power supplies (must be tied externally to AVDD3 the WSCR pin is replaced by VPP which is the programming voltage).

TXCF Analog pin for the Teletext slicer line PLL.

CVBSO, JTDO, JTCK Test pins: leave floating.

JTMS, TEST0 Test pins: must be tied to AVDD2.

JTRST0 Test pin: must be tied to GND.

Note 1: The WSCF and WSCR pins are not available on all devices. On EPROM/OTP devices the WSCR pin is replaced by VPP which is the programming voltage. VPP should be tied to GND or VDD in user mode.

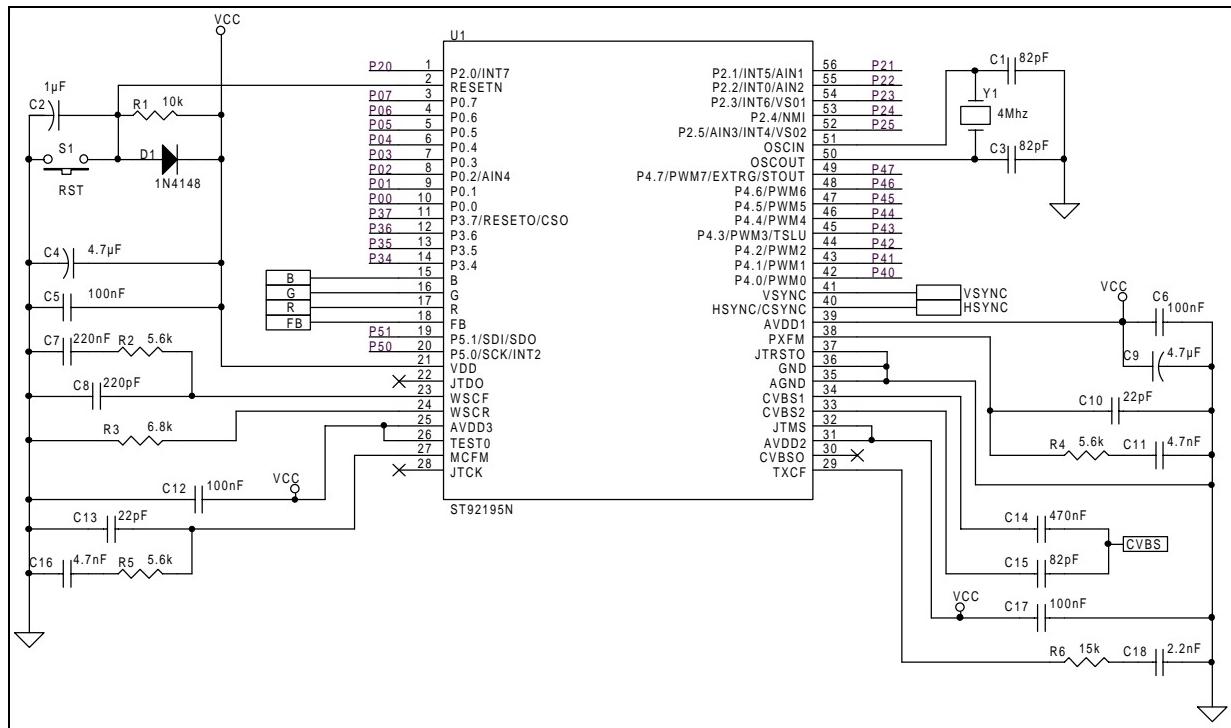
Figure 3. 56-Pin Package Pin-Out

INT7/P2.0	1	56	P2.1/INT5/AIN1
RESET	2	55	P2.2/INT0/AIN2
P0.7	3	54	P2.3/INT6/VSO1
P0.6	4	53	P2.4/NMI
P0.5	5	52	P2.5/AIN3/INT4/VS02
P0.4	6	51	OSCIN
P0.3	7	50	OSCOUT
AIN4/P0.2	8	49	P4.7/PWM7/EXTRG/STOUT
P0.1	9	48	P4.6/PWM6
P0.0	10	47	P4.5/PWM5
CSO/RESET0/P3.7	11	46	P4.4/PWM4
P3.6	12	45	P4.3/PWM3/TSLU/HT
P3.5	13	44	P4.2/PWM2
P3.4	14	43	P4.1/PWM1
B	15	42	P4.0/PWM0
G	16	41	VSYNC
R	17	40	H SYNC/C SYNC
FB	18	39	AVDD1
SDI/SDO/P5.1	19	38	PXFM
SCK/INT2/P5.0	20	37	JTRST0
V _{DD}	21	36	GND
JTDO	22	35	AGND
*WSCF	23	34	CVBS1
*VPP/WSCR	24	33	CVBS2
AVDD3	25	32	JTMS
TEST0	26	31	AVDD2
MCFM	27	30	CVBSO
JTCK	28	29	TXCF

*See Note 1 of pin description.

ST92195B - GENERAL INFORMATION

Figure 4. ST92195 Required External components



PIN DESCRIPTION (Cont'd)

P0[7:0], P2[5:0], P3[7:4], P4[7:0], P5[1:0]
I/O Port Lines (Input/Output, TTL or CMOS compatible).

28 lines grouped into I/O ports, bit programmable as general purpose I/O or as Alternate functions (see I/O section).

Important: Note that open-drain outputs are for logic levels only and are not true open drain.

1.2.1 I/O Port Alternate Functions.

Each pin of the I/O ports of the ST92195 may assume software programmable Alternate Functions (see Table 1).

Table 1. ST92195 I/O Port Alternate Function Summary

Port bit	Alternate Function	Name	Function
P0.2	A/D Analog input 4	AIN4	I
P2.0	External interrupt 7	INT7	I
P2.1	External interrupt 5	INT5	I
	A/D analog input 1	AIN1	I
P2.2	External interrupt 0	INT0	I
	A/D analog input 2	AIN2	I
P2.3	External interrupt 6	INT6	I
	Voltage synthesis output1	VSO1	O
P2.4	Non-maskable interrupt	NMI	I
P2.5	Voltage synthesis output2	VSO2	O
	A/D analog input 3	AIN3	I
	External interrupt 4	INT4	I
P3.4			
P3.5			
P3.7	Internal reset output	RESETO	O
	Composite Sync output	CSO	O
P4.0	PWM output 0	PWM0	O
P4.1	PWM output 1	PWM1	O
P4.2	PWM output 2	PWM2	O
P4.3	PWM output 3	PWM3	O
	Translucency digital output	TSLU	O
	Half-tone output	HT	O
P4.4	PWM output 4	PWM4	O
P4.5	PWM output 5	PWM5	O
P4.6	PWM output 6	PWM6	O
P4.7	PWM output 7	PWM7	O
	External A/D trigger	EXTRG	I
	Standard timer output	STOUT	O
P5.0	External interrupt 2	INT2	I
	SPI serial clock	SCK	O
P5.1	SPI serial data out	SDO	O
	SPI serial data in	SDI	I

ST92195B - GENERAL INFORMATION

1.2.2 I/O Port Styles

Pins	Weak Pull-Up	Port Style	Reset Values
P0[7:0]	no	Standard I/O	BID / OD / TTL
P2[5,4,3,2]	no	Standard I/O	BID / OD / TTL
P2[1,0]	no	Schmitt trigger	BID / OD / TTL
P3.7	yes	Standard I/O	AF / PP / TTL
P3[6,5,4]	no	Standard I/O	BID / OD / TTL
P4[7:0]	no	Standard I/O	BID / OD / TTL
P5[1:0]	no	Standard I/O	BID / OD / TTL

Legend:

AF= Alternate Function, BID = Bidirectional, OD = Open Drain

PP = Push-Pull, TTL = TTL Standard Input Levels

How to Read this Table

To configure the I/O ports, use the information in this table and the Port Bit Configuration Table in the I/O Ports Chapter on [page 68](#).

Port Style= the hardware characteristics fixed for each port line.

Inputs:

- If port style = Standard I/O, either TTL or CMOS input level can be selected by software.
- If port style = Schmitt trigger, selecting CMOS or TTL input by software has no effect, the input will always be Schmitt Trigger.

Weak Pull-Up = This column indicates if a weak pull-up is present or not.

- If WPU = yes, then the WPU can be enabled/disable by software
- If WPU = no, then enabling the WPU by software has no effect

Alternate Functions (AF) = More than one AF cannot be assigned to an external pin at the same time:

An alternate function can be selected as follows.

AF Inputs:

- AF is selected implicitly by enabling the corresponding peripheral. Exception to this are ADC analog inputs which must be explicitly selected as AF by software.

AF Outputs or Bidirectional Lines:

- In the case of Outputs or I/Os, AF is selected explicitly by software.

Example 1: ADC trigger digital input

AF: EXTRG, Port: P4.7, Port Style: Standard I/O.

Write the port configuration bits (for TTL level):

P4C2.7=1

P4C1.7=0

P4C0.7=1

Enable the ADC trigger by software as described in the ADC chapter.

Example 2: PWM 0 output

AF: PWM0, Port: P4.0

Write the port configuration bits (for output push-pull):

P4C2.0=0

P4C1.0=1

P4C0.0=1

Example 3: ADC analog input

AF: AIN1, Port : P2.1, Port style: does not apply to analog inputs

Write the port configuration bits:

P2C2.1=1

P2C1.1=1

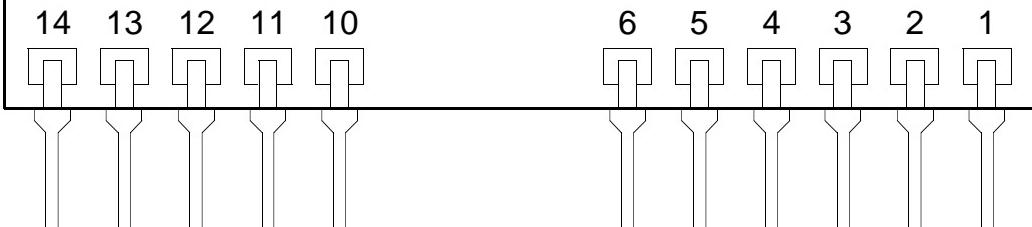
P2C0.1=1

IC DESCRIPTION

I801

POWER CONTROL MODULE

DPM 001 TI
KSE



PIN NO	DESCRIPTION	PIN NO	DESCRIPTION
1	GATE DRIVE1	10	+12V INPUT
2	OCP	11	POWER CONTROL
3	SOURCE	12	NC
4	GND1	13	GND2
5	GATE	14	+133V INPUT
6	GATE DRIVE2		



STV223XD/223X/224X

BUS CONTROLLED MULTISTANDARD ONE CHIP TV PROCESSOR

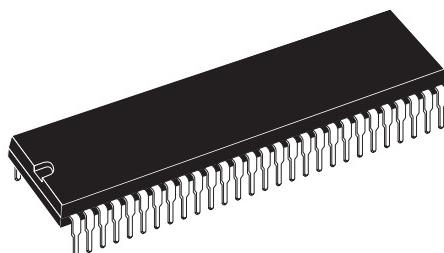
PRODUCT PREVIEW

FEATURES

- I²C BUS CONTROL.
- PIF CIRCUIT WITH PLL DEMODULATION (Positive and Negative Video).
- SIF CIRCUIT WITH QSS STRUCTURE, FM DEMODULATION AND AM DEMODULATION FOR FRANCE.
- INTERCARRIER CAPABILITY.
- BUILT IN SOUND BANDPASS.
- SOUND SUB CARRIERS OUTPUT FOR STEREO CHASSIS (FM, Nicam).
- AUDIO SWITCH AND VOLUME CONTROL (Mono Chassis).
- INTEGRATED CHROMA FILTERS AND LUMA DELAY LINE.
- INTEGRATED CHROMA DELAY LINE.
- VIDEO SWITCH (3 CVBS IN, 1 or 2 CVBS OUT).
- SVHS SWITCH (Y combined with CVBS3 input).
- OSD RGB INPUTS.
- EXTERNAL RGB/YUV INPUTS or YUV INTERFACE.
- PAL / SECAM / NTSC CHROMA DEMODULATORS.
- AUTO FLESH CONTROL CAPABILITY IN NTSC.
- SOUTH AMERICA CAPABILITY (PALM/PALN/NTSC).
- CHROMA SUBCARRIER OUTPUT.
- BLACK STRETCH CIRCUIT.
- PEAKING CIRCUIT.
- AUTOMATIC CUT-OFF CURRENT LOOP.
- MANUAL CUT-OFF POSSIBLE FOR LOW COST APPLICATIONS.
- TWO PLLs HORIZONTAL DEFLECTION.
- VERTICAL COUNT DOWN.
- HALF CONTRAST (optional).
- APR (Automatic RGB peak regulation) FUNCTION (optional).
- SAW FILTER SWITCH CONTROL (optional).
- VERY FEW EXTERNAL COMPONENTS.

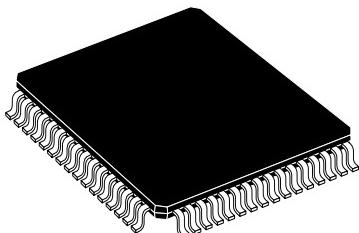
DESCRIPTION

The STV223XD/223X/224X are fully bus controlled ICs for TV including PIF, SIF, luma, chroma and deflection processing. Used with a vertical frame booster (TDA1771 or TDA8174 for 90° chassis, STV9306 for 110° chassis), they allow the design of multistandard (BGDKIMNLL, PAL/SECAM/NTSC) sets with very few external components and no manual adjustments.



SHRINK56
(Plastic Package)

ORDER CODE: STV223X/4X/8X



TQFP64 (14 x 14 x 1.4 mm)
(Full Thin Plastic Quad Flat Pack)

ORDER CODE: STV223XD

Pin N°			Symbol	Description
STV224X/8X	STV223X	STV223XD		
SDIP56	SDIP56	TQFP64		
1	1	8	SIFIN1	SIF Input
2	2	9	SIFIN2	SIF Input
3	3	10	AGCSIFCAP	AGC SIF Capacitor
4	4	11	V _{REF} IF	Voltage Reference Filtering
5	5	12	AGCPIFCAP	AGC PIF Capacitor
6	6	13	PIFIN1	PIF Input
7	7	14	PIFIN2	PIF Input
8	8	16	TUNERAGCOUT	AGC Tuner Output
9	9	17	IFPLL	IF PLL Filter
10	10	18	GND IF	IF Ground
11	11	19	AM/FMOUT/SC	AM/FM Mono Sound or Stereo Carriers Output
12	12	20	V _{CC} IF	5 V IF Supply
13	13	21	INTCVBSOUT	Internal CVBS Output
14	14	22	EXTAUDIOIN	External Audio Input
15	15	23	PIFLC1	LC Input
16	16	24	PIFLC2	LC Input
17	17	25	V _{CC} 2	Video/Luma Supply Voltage (8 V)
18	18	26	CVBSIN1	Internal Video Input
19	19	27	GND2	Video/Luma Ground
20	20	28	CVBSIN2	External Video Input
21	21	29	BS	Black Stretch Capacitor
22	22	34	Y/CVBSIN3	Y(SVHS) or CVBS3 External Input
23	23	35	CHR	Chroma (SVHS) Input
-	24	37	UIN	B-Y Input (Note 1)
-	25	38	VIN	R-Y Input (Note 1)
-	26	39	YIN	Y Input (Note 1)
-	27	40	YOUT	Y Output (Note 1)
-	28	41	VOUT	R-Y Output (Note 1)
-	29	42	UOUT	B-Y Output (Note 1)
30	30	43	BOUT	Blue Output
31	31	44	GOUT	Green Output
32	32	45	ROUT	Red Output
33	33	46	I _{CATH}	Cathode Current Measurement Input
34	34	47	BOSD	OSD Blue Input
35	35	48	GOSD	OSD Green Input
36	36	49	ROSD	OSD Red Input
37	37	50	FBOSD	OSD Fast Blanking
38	38	52	XTAL3/BTUN	3.5X MHz Crystal or Cloche Filter Tuning Capacitor
39	39	53	XTAL2	3.5X MHz Crystal
40	40	54	XTAL1	4.43/3.5X MHz Crystal
41	41	55	CLPF	Chroma PLL Filter
42	42	56	X1/VAMP/CHROUT	XTAL1 Control Pin, Vertical Amplitude DAC Output and Chroma Reference Signal Output.
43	43	57	GND1	Chroma/Scanning Ground

STV223XD/3X/4X

Pin N°			Symbol	Description
STV224X/8X	STV223X	STV223XD		
SDIP56	SDIP56	TQFP64		
-	44	58	CVBSOUT1	Main Video Switch Output
45	45	59	V _{CC1}	Chroma/Scanning Power Supply (8 V)
46	46	61	BCL/SAF	Beam Current Limiter Control Voltage and Safety Input (XRAY)
47	47	62	VERT	Vertical Output Pulse
48	48	63	HOUT	Horizontal Output Pulse
49	49	64	LFB/SSC	Line Flyback Input and Super-sandcastle Output
50	50	1	SLPF	Scanning PLL Filter
51	51	2	SCL	I ² C Bus Clock Input
52	52	3	SDA	I ² C Bus Data Input
53	53	4	V _{CCD}	Digital Supply Voltage (5 V)
54	54	5	GND D	Digital Ground
55	55	6	AUDIOOUT	Main Audio Output
56	56	7	FMCAP	FM Demodulation Capacitor
-	-	15	SAW	Filter Switch Control
25	-	30	BEXT/UEXT	External Blue Input or external U input
26	-	31	GEXT/YEXT	External Green Input or external Y input
27	-	32	REXT/VEXT	External Red Input or external V input
28	-	33	FBEXT	External Fast Blanking Input
24	-	36	APR	Automatic RGB Peak Regulation
-	-	51	HALFCTR	Half Contrast Input
44	-	60	CVBSOUT2	Second Video Switch Output

Note: 1. Input/Output not available in STV2236 and STV2236D versions.

PIN CONNECTIONS STV223X (SDIP56)

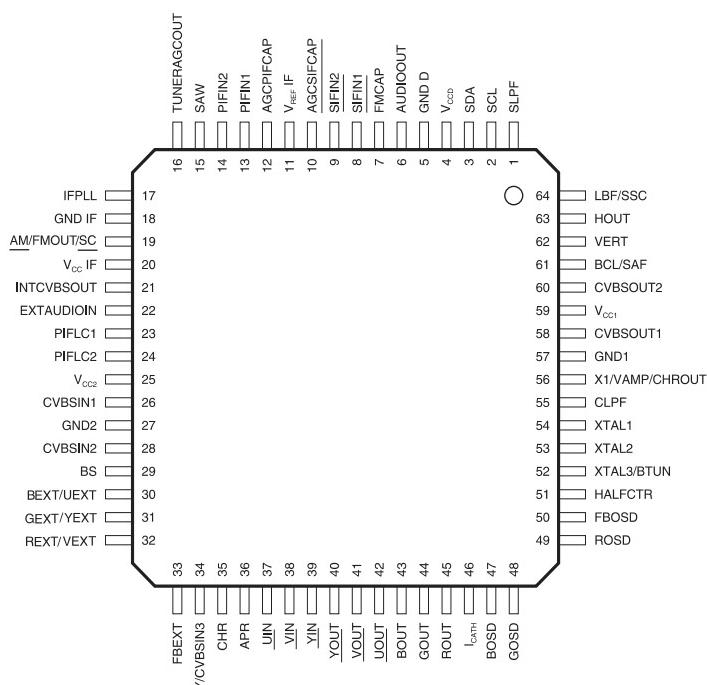
SIFIN1	1	56	FMCAP
SIFIN2	2	55	AUDIOOUT
<u>AGCSIFCAP</u>	3	54	GND D
V _{REF} IF	4	53	V _{CCD}
<u>AGCPIFCAP</u>	5	52	SDA
PIFIN1	6	51	SCL
PIFIN2	7	50	SLPF
TUNERAGCOUT	8	49	LBF/SSC
IFPLL	9	48	HOUT
GND IF	10	47	VERT
<u>AM/FMOUT/SC</u>	11	46	BCL/SAF
V _{cc} IF	12	45	V _{CC1}
INTCVBSOUT	13	44	CVBSOUT1
EXTAUDIOIN	14	43	GND1
PIFLC1	15	42	X1/VAMP/CHROUT
PIFLC2	16	41	CLPF
V _{cc2}	17	40	XTAL1
CVBSIN1	18	39	XTAL2
GND2	19	38	XTAL3/BTUN
CVBSIN2	20	37	FBOSD
BS	21	36	ROSD
Y/CVBSIN3	22	35	GOSD
CHR	23	34	BOSD
UIN	24	33	I _{CATH}
VIN	25	32	ROUT
YIN	26	31	GOUT
YOUT	27	30	BOUT
VOUT	28	29	UOUT

PIN CONNECTIONS STV224X/8X (SDIP56)

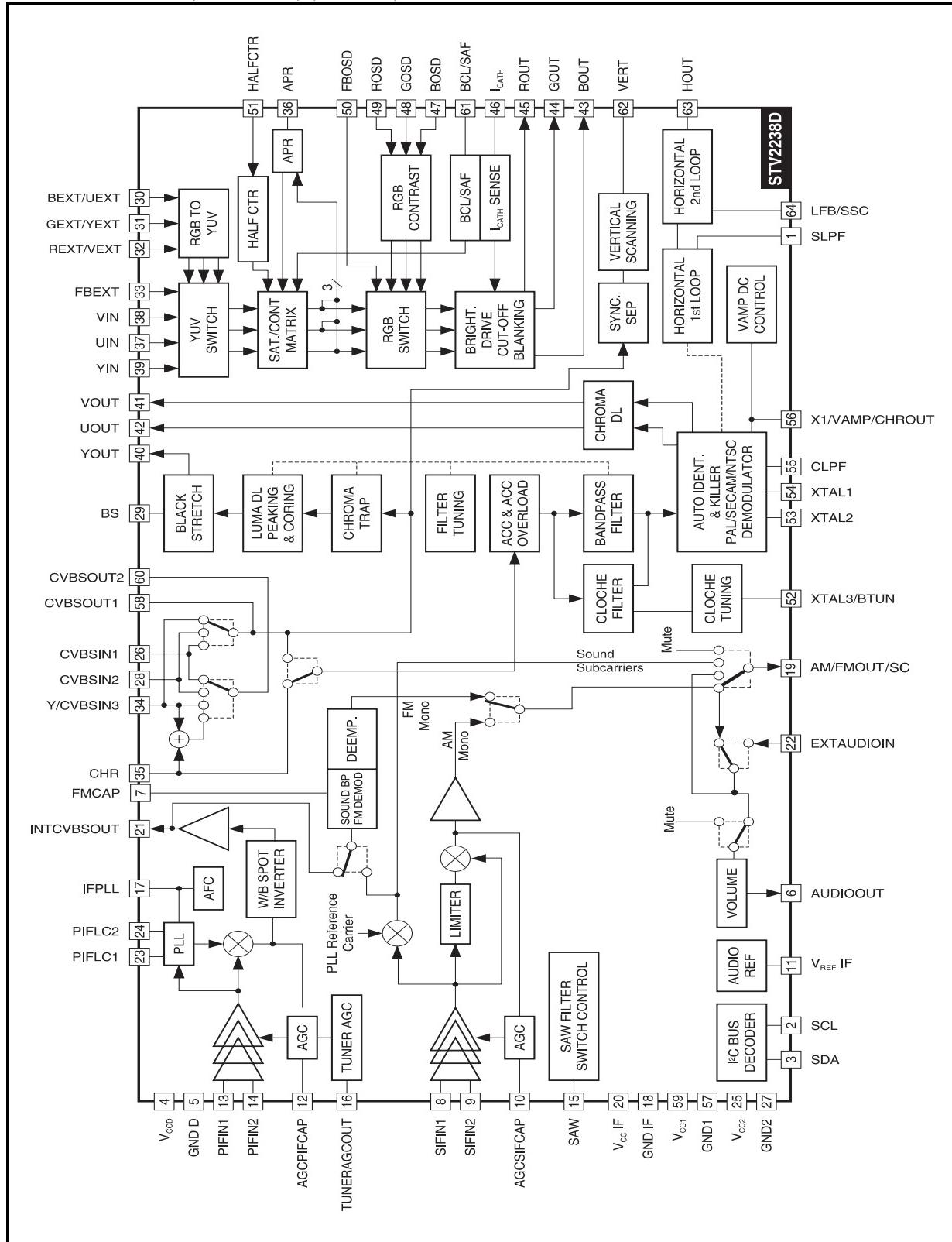
SIFIN1	1	56	FMCAP
SIFIN2	2	55	AUDIOOUT
<u>AGCSIFCAP</u>	3	54	GND D
V _{REF} IF	4	53	V _{CCD}
<u>AGCPIFCAP</u>	5	52	SDA
PIFIN1	6	51	SCL
PIFIN2	7	50	SLPF
TUNERAGCOUT	8	49	LBF/SSC
IFPLL	9	48	HOUT
GND IF	10	47	VERT
<u>AM/FMOUT/SC</u>	11	46	BCL/SAF
V _{cc} IF	12	45	V _{CC1}
INTCVBSOUT	13	44	CVBSOUT2
EXTAUDIOIN	14	43	GND1
PIFLC1	15	42	X1/VAMP/CHROUT
PIFLC2	16	41	CLPF
V _{cc2}	17	40	XTAL1
CVBSIN1	18	39	XTAL2
GND2	19	38	XTAL3/BTUN
CVBSIN2	20	37	FBOSD
BS	21	36	ROSD
Y/CVBSIN3	22	35	GOSD
CHR	23	34	BOSD
APR	24	33	I _{CATH}
BEXT/UEXT	25	32	ROUT
GEXT/YEXT	26	31	GOUT
REXT/VEXT	27	30	BOUT
FBEXT	28	29	NC

NOTE:
UNDERLINED PIN
FUNCTIONS ARE OPTIONAL

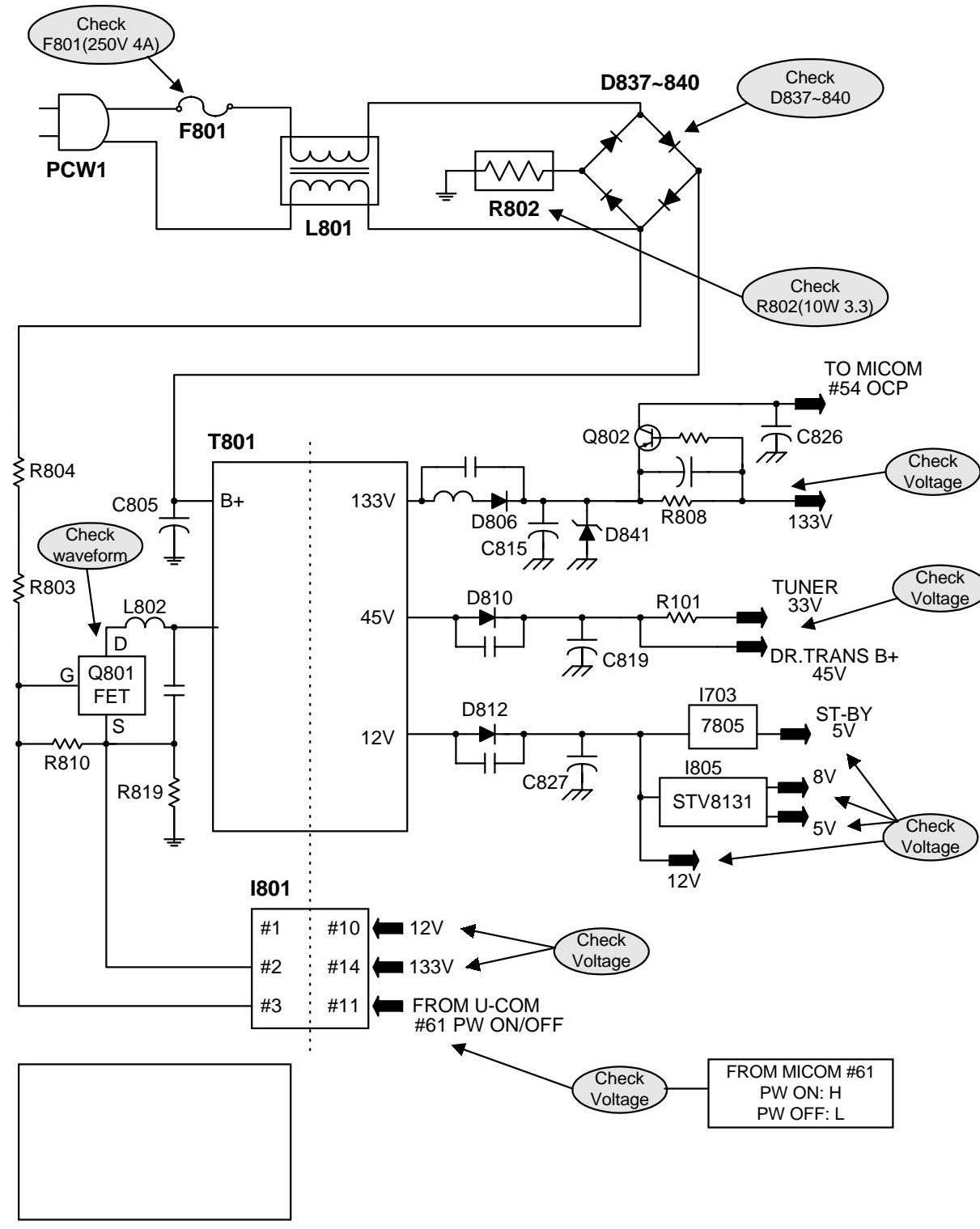
PIN CONNECTIONS STV223XD (TQFP64)



BLOCK DIAGRAM (STV2238D) (TQFP64)



1. NO POWER



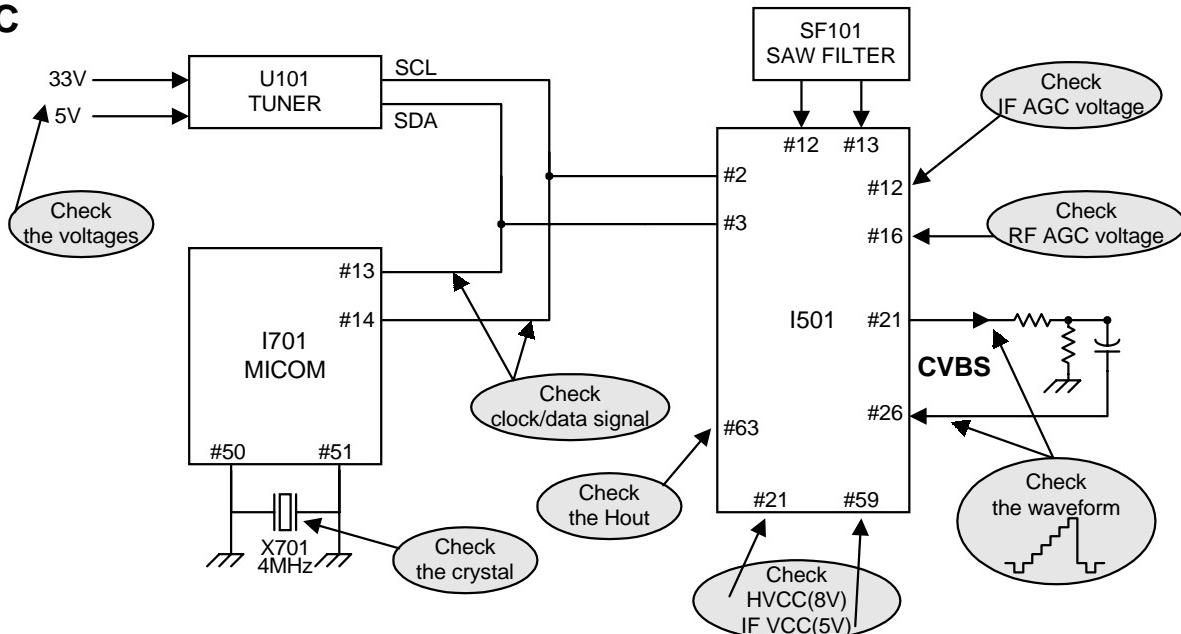
2. NO PICTURE

Check the wave of I501 #21

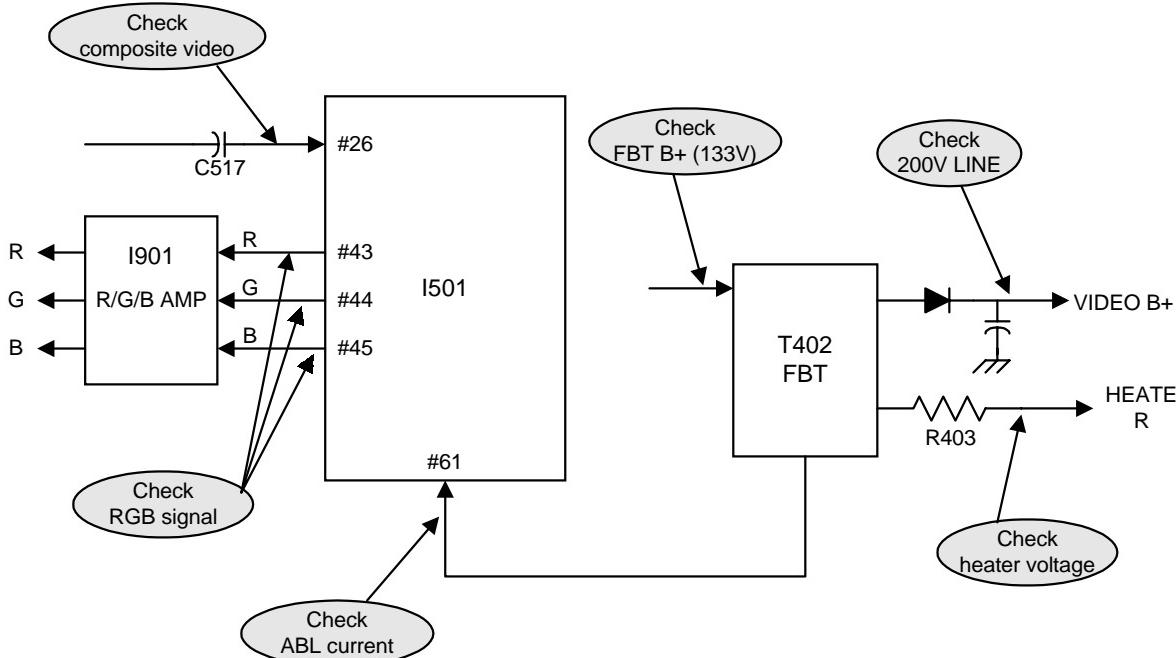
NG : Go to the figure C

OK : Go to the figure D

C



D



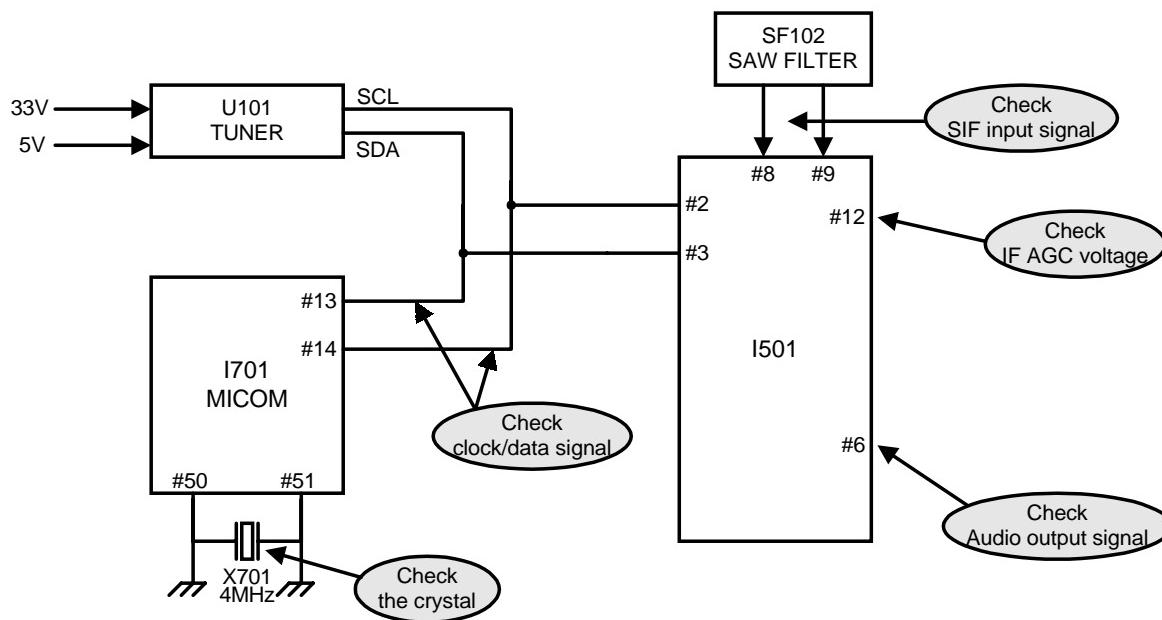
3. NO SOUND

Check audil output signal of I501 #8

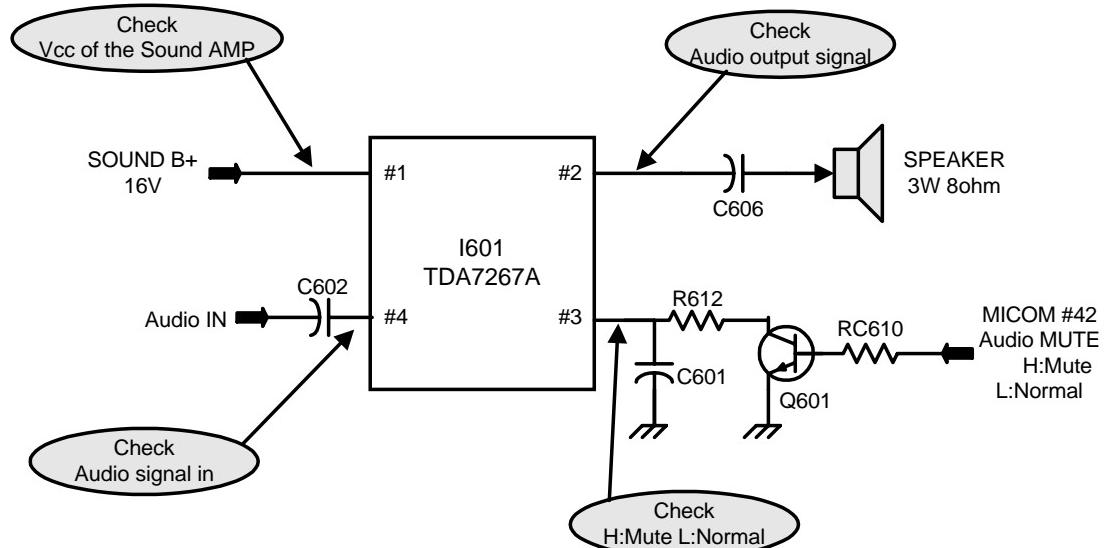
NG : Go to the figure E

OK : Go to the figure F

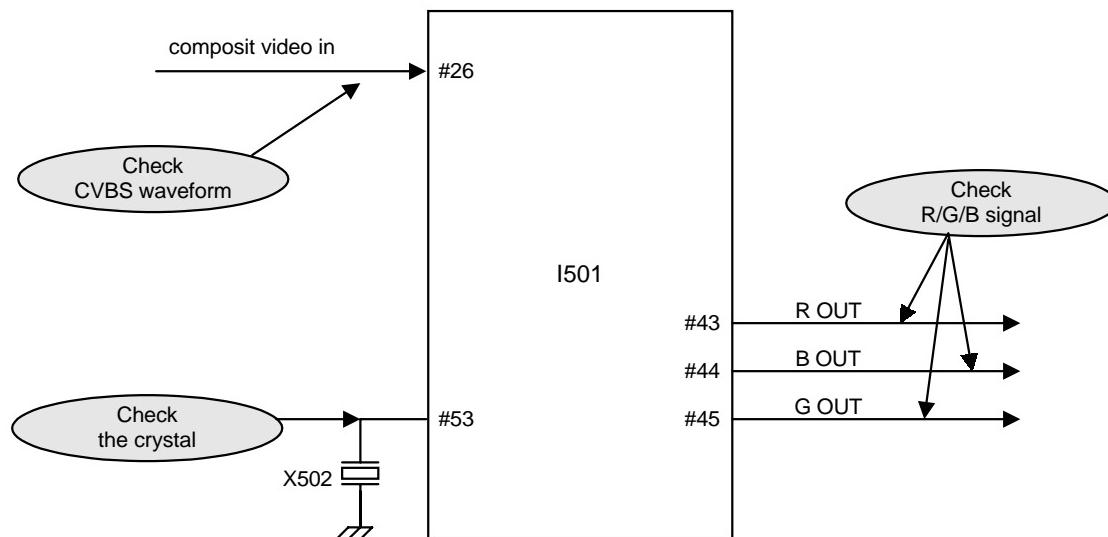
E



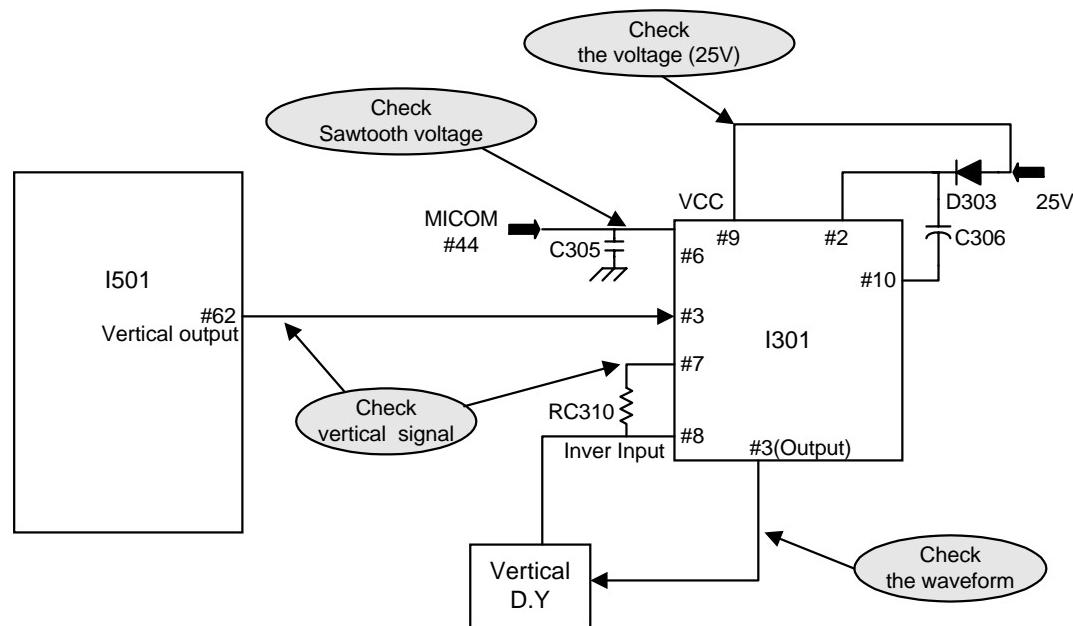
F



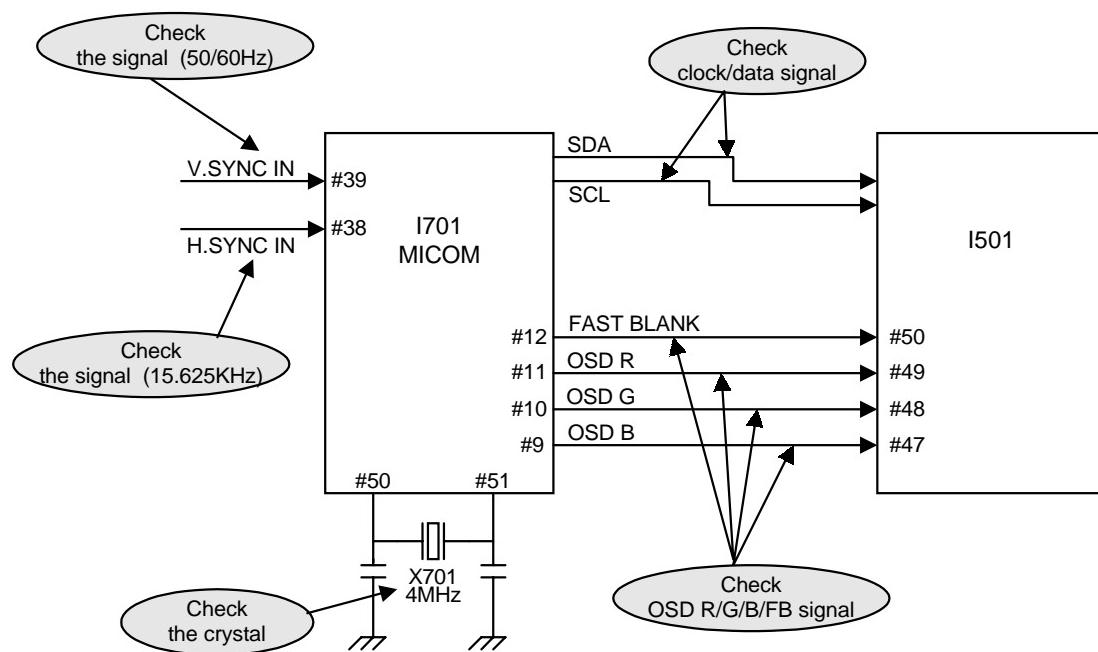
4. NO COLOR



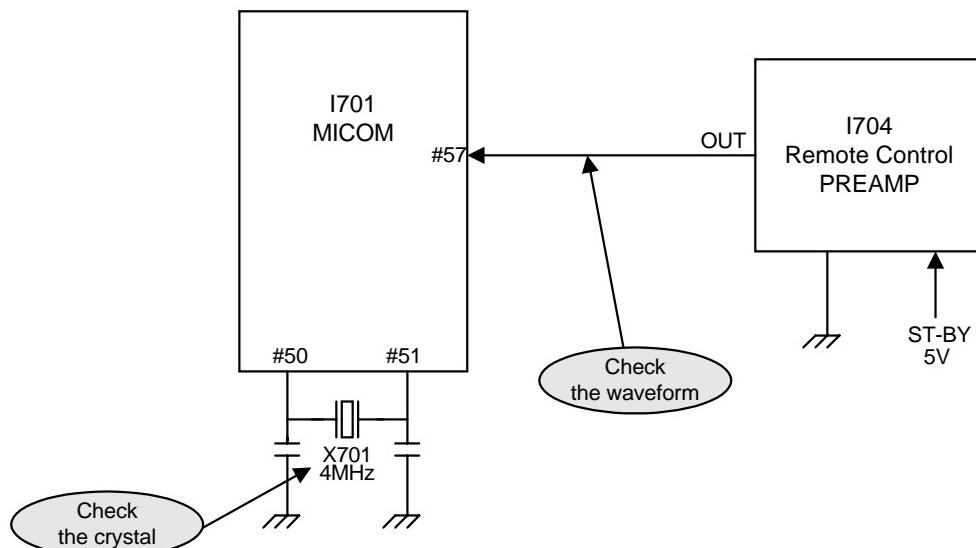
5. NO VERTICAL DEFLECTION



6. NO ON-SCREEN DISPLAY



7. REMOTE CONTROL DOES NOT OPERATE



ELECTRICAL PARTS LIST

" " is a safety part, so it must be used the same part.

LOC	PART CODE	PART NAME	DESCRIPTION		
ZZ100	48B3740A01	TRANSMITTER REMOCON	R-40A01		
ZZ110	PTACPWA627	ACCESSORY AS	DTP-14C5TF		
00100	4850Q00910	BATTERY	R03/NN		
M821	4858213800	BAG INSTRUCTION	L.D.P.E T0.05X250X400		
ZZ120	PTBCSHD318	COVER BACK AS	DTP-21V4TF		
M211	4852151601	COVER BACK	HIPS BK		
M541	4855415800	SPEC PLATE	150ART P/E FILM (C/TV)		
ZZ130	PTPKCDP342	PACKING AS	DTP-21C6TF		
10	6520010100	STAPLE PIN	18M/M J D O		
20	6520010200	STAPLE PIN	#3417		
M801	485805063B	BOX CARTON	DW-3A		
M811	4858190700	PAD	EPS 21C6		
M821	4858211800	BAG P.E	L.D.P.E T0.03X1300X1000		
ZZ131	48519A5310	CRT GROUND NET	2101S-1015-1P		
ZZ132	58G0000074	COIL DEGAUSSING	DC-2070		
ZZ140	PTCACACD342	CABINET AS	DTP-21C6TF		
CRT1	PTRTPWD215	CRT AS	PAL 21" ITC CRT AS		
V01	58D0000086	COIL DY	ODY-L2144		
V02	48A96R004-	RUBBER WEDGE	HMR 28 SR (0X54)		
V03	4850PM001-	MAGNET CP	NY-225 (MINI NECK)		
V04	2TC26019BE	TAPE CLOTH	19X30 BEIGE		
V05	2224050026	BOND SILICON	RTV 122 CARTRIDGE		
V06	2233030001	PAINT LOCK	3B-1401B		
V901	48A96321P1	CRT BARE	A51JSW90X		
M191	4851934102	BUTTON CTRL	4943202+5538001		
M191A	7178301212	SCREW TAPPTITE	TT2 WAS 3X12 MFZN BK		
M201A	4856013301	SCREW CRT FIXING	30X140 YL		
M201B	4856214902	WASHER RUBBER	CR T2.0		
M201C	4856013303	SCREW CRT FIXING	30X250 YL		
M211A	7172401412	SCREW TAPPTITE	TT2 TRS 4X14 MFZN BK		
M211B	7172401412	SCREW TAPPTITE	TT2 TRS 4X14 MFZN BK		
M491	4854943203	BUTTON POWER	ABS BK		
M561	4855621401	MARK BRAND	ABS BK		
M681	4856812001	TIE CABLE	NYLON66 DA100		
SP01A	7178301212	SCREW TAPPTITE	TT2 WAS 3X12 MFZN BK		
ZZ200	PTFMSJD342	MASK FRONT AS	DTP-21C6TF		
M201	4852071401	MASK FRONT	HIPS BK		
ZZ210	PTSPPWA627	SPEAKER AS	DTP-14C5TF		
P601A	4850703S50	CONNECTOR	YH025-03+35098+ULW=200		
SP01	4858314010	SPEAKER	SP-5070F01 3W 8 OHM		
ZZ290	PTMPMSD318	PCB MAIN MANUAL AS	DTP-21V4TF		
C401	CMYE2D184J	C MYLAR	200V PU 0.18MF J		
C404	CMYH3C622H	C MYLAR	1.6KV BUP 6200PF H		
C411	CMYN1J105K	C MYLAR (MKT)	63V 1MF K (7.5MM)		
C801	CL1JB3474K	C LINE ACROSS	AC250V 0.47MF U/C/SNDF/SV		
C805	CEYN2G181P	C ELECTRO	400V LHS 180MF (25X35)		
C807	CMYU3C222J	C MYLAR	1.6KV BCP 2200PF J		
C809	CH1HFE102M	C CERA AC	4.0KV 1000PF E DG		
C812	CH1HFE102M	C CERA AC	4.0KV 1000PF E DG		
C814	CCYR3A471K	C CERA	1KV R 470PF K 125 DE0705		
D404	DDG3-----	DIODE	DG3		
D706	DLH2PR----	LED BLOCK	LH-2P-R		
D806	DRGP30J---	DIODE	RGP30J		
F801	5FSCB4022R	FUSE CERA	SEMKO F4AH 4A 250V MF51		
I301	PTA2SW7104	HEAT SINK ASS`Y	1TDA1771-- + 7174301011		
I301	1TDA1771--	IC VERTICAL	TDA1771		
I301A	4857027104	HEAT SINK	SPCC T1.0+SN		
I301B	7174301011	SCREW TAPPTITE	TT2 RND 3X10 MFZN		
I601	1TDA7267A-	IC AMP	TDA7267A		
I702	1AT24C16PC	IC	AT24C16-10PC		
I703	1KA7805---	IC REGULATOR	KA7805		
I704	1KRT30----	IC PREAMP	KRT30		
I802	4850M04710	MODULE POWER	DPM001T1A		
I805	PTA2SW6904	HEAT SINK ASS`Y	1STV8131-- + 7174301011		
I805	1STV8131--	IC REGULATOR	STV8131		
I805A	4857026904	HEAT SINK	AL EX		
I805B	7174301011	SCREW TAPPTITE	TT2 RND 3X10 MFZN		
I901	PTB3SW1100	HEAT SINK ASS`Y	1TDA6103Q- + 7174301011		
I901	1TDA6103Q-	IC VIDEO	TDA6103Q		
I901A	4857031100	HEAT SINK	A1050P-H24 T2.0		
I901B	7174301011	SCREW TAPPTITE	TT2 RND 3X10 MFZN		
JS02	4859109950	JACK PIN BOARD	PH-JB-9710A		
L101	58N0000044	COIL VCO	TRF-V010		
L402	58H0000052	COIL H-LINEARITY	TRL-541B		
L801	5PLF24A3--	FILTER LINE	LF-24A3		
L805	58C4500079	COIL CHOKE	L-45		
M681	4856812001	TIE CABLE	NYLON66 DA100		
M721	4857235402	SHIELD CASE	SPTH-C T0.25		
P401	4859240120	CONN WAFER	YFW500-06		
P801	4859287320	CONN WAFER	MKS2822-6-10-202		
P802	4859242220	CONN WAFER	YFW800-02		
P901	4850709N02	CONNECTOR	YBNH250-09YBNT025+ULW=300		
RA801	4859906210	CORD POWER AS	6-L0+H03VVH2=2200		
Q402	T2SD2499--	TR	2SD2499		
Q801	PTR2SW4500	HEAT SINK ASS`Y	T2SK2671-- + 7174300811		
Q801	T2SK2671--	FET	2SK2671		
Q801A	4857024500	HEAT SINK	AL EX B/K		
Q801B	7174300811	SCREW TAPPTITE	TT2 RND 3X8 MFZN		
R801	DEC140M290	POSISTOR	ECPCC140M290		
R802	RX07C339JF	R CEMENT	7W 3.3 OHM J 15MM 4P		
RLY1	5SC0101338	SW RELAY	DQ5D1-O(M)/GJ-SS-105LM		
SCT1	4859303430	SOCKET CRT	PCS633A		
SF101	5PG3962M--	FILTER SAW	G 3962-M		

ELECTRICAL PARTS LIST

SF102	5PK9650M--	FILTER SAW	K9650M		CC709	HCQK220JCA	C CHIP CERA	50V CH 22PF J 2012
SJ01	4859200401	SOCKET RGB	YRS21-R1		CC713	HCBK222KCA	C CHIP CERA	50V X7R 2200PF K 2012
SW801	5S40101146	SW POWER PUSH	SS-160-7-B		CC722	HCQK102JCA	C CHIP CERA	50V CH 1000PF J 2012
T401	50D10A3---	TRANS DRIVE	TD-10A3		CC723	HCQK220JCA	C CHIP CERA	50V CH 22PF J 2012
! T402	50H0000202	FBT	FUY20C001		CC801	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012
! T801	50M4042A5-	TRANS SMPS	TSM-4042A5		CC830	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012
! U101	4859719930	TUNER VARACTOR	DT5-BF18D		I501	1STV2238DQ	IC CHIP VIDEO	STV2238D
W101	4851900130	GROUND TUNER AS	DS-W1015-S		I701	1ST195EPMQ	IC CHIP MICOM OTP	ST92T195Q1/EPM
ZZ200	PTMPJ2D318	PCB CHIP MOUNT B AS	DTP-21V4TF		JC001	HRFT000-CA	R CHIP	1/10 0 OHM 2012
CC102	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012		JC002	HRFT000-CA	R CHIP	1/10 0 OHM 2012
CC103	HCQK101JCA	C CHIP CERA	50V CH 100PF J 2012		JC003	HRFT000-CA	R CHIP	1/10 0 OHM 2012
CC104	HCQK101JCA	C CHIP CERA	50V CH 100PF J 2012		JC004	HRFT000-CA	R CHIP	1/10 0 OHM 2012
CC105	HCQK102JCA	C CHIP CERA	50V CH 1000PF J 2012		JC005	HRFT000-CA	R CHIP	1/10 0 OHM 2012
CC108	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012		JC006	HRFT000-CA	R CHIP	1/10 0 OHM 2012
CC109	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012		JC008	HRFT000-CA	R CHIP	1/10 0 OHM 2012
CC118	HCBK104KCA	C CHIP CERA	50V X7R 0.1MF K 2012		JC009	HRFT000-CA	R CHIP	1/10 0 OHM 2012
CC412	HCQK160JCA	C CHIP CERA	50V CH 16PF J 2012		JC011	HRFT000-CA	R CHIP	1/10 0 OHM 2012
CC501	HCQK101JCA	C CHIP CERA	50V CH 100PF J 2012		JC012	HRFT000-CA	R CHIP	1/10 0 OHM 2012
CC502	HCFK103ZCA	C CHIP CERA	50V Y5V 0.01MF Z 2012		JC013	HRFT000-CA	R CHIP	1/10 0 OHM 2012
CC504	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012		JC014	HRFT000-CA	R CHIP	1/10 0 OHM 2012
CC505	HCBK472KCA	C CHIP CERA	50V X7R 4700PF K 2012		JC015	HRFT000-CA	R CHIP	1/10 0 OHM 2012
CC506	HCQK102JCA	C CHIP CERA	50V CH 1000PF J 2012		JC016	HRFT000-CA	R CHIP	1/10 0 OHM 2012
CC508	HCBK472KCA	C CHIP CERA	50V X7R 4700PF K 2012		JC017	HRFT000-CA	R CHIP	1/10 0 OHM 2012
CC509	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012		JC018	HRFT000-CA	R CHIP	1/10 0 OHM 2012
CC510	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012		JC019	HRFT000-CA	R CHIP	1/10 0 OHM 2012
CC511	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012		JC020	HRFT000-CA	R CHIP	1/10 0 OHM 2012
CC512	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012		JC022	HRFT000-CA	R CHIP	1/10 0 OHM 2012
CC515	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012		JC024	HRFT000-CA	R CHIP	1/10 0 OHM 2012
CC516	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012		JC025	HRFT000-CA	R CHIP	1/10 0 OHM 2012
CC517	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012		RC106	HRFT682JCA	R CHIP	1/10 6.8K OHM J 2012
CC518	HCBK222KCA	C CHIP CERA	50V X7R 2200PF K 2012		RC107	HRFT473JCA	R CHIP	1/10 47K OHM J 2012
CC519	HCFK334ZCA	C CHIP CERA	50V Y5V 0.33MF Z 2012		RC111	HRFT511JCA	R CHIP	1/10 510 OHM J 2012
CC520	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012		RC114	HRFT432JCA	R CHIP	1/10 4.3K OHM J 2012
CC521	HCBK472KCA	C CHIP CERA	50V X7R 4700PF K 2012		RC115	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
CC522	HCQK102JCA	C CHIP CERA	50V CH 1000PF J 2012		RC301	HRFT561JCA	R CHIP	1/10 560 OHM J 2012
CC523	HCQK102JCA	C CHIP CERA	50V CH 1000PF J 2012		RC302	HRFT222JCA	R CHIP	1/10 2.2K OHM J 2012
CC524	HCQK102JCA	C CHIP CERA	50V CH 1000PF J 2012		RC303	HRFT562JCA	R CHIP	1/10 5.6K OHM J 2012
CC526	HCBK223KCA	C CHIP CERA	50V X7R 0.022MF K 2012		RC304	HRFT332JCA	R CHIP	1/10 3.3K OHM J 2012
CC533	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012		RC306	HRFT472JCA	R CHIP	1/10 4.7K OHM J 2012
CC534	HCQK300JCA	C CHIP CERA	50V CH 30PF J 2012		RC307	HRFT562JCA	R CHIP	1/10 5.6K OHM J 2012
CC535	HCQK300JCA	C CHIP CERA	50V CH 30PF J 2012		RC308	HRFT332JCA	R CHIP	1/10 3.3K OHM J 2012
CC536	HCQK300JCA	C CHIP CERA	50V CH 30PF J 2012		RC309	HRFT154JCA	R CHIP	1/10 150K OHM J 2012
CC602	HCQK102JCA	C CHIP CERA	50V CH 1000PF J 2012		RC310	HRFT103JCA	R CHIP	1/10 10K OHM J 2012
CC603	HCQK102JCA	C CHIP CERA	50V CH 1000PF J 2012		RC313	HRFT224JCA	R CHIP	1/10 220K OHM J 2012
CC604	HCQK102JCA	C CHIP CERA	50V CH 1000PF J 2012		RC404	HRFT561JCA	R CHIP	1/10 560 OHM J 2012
CC605	HCQK471JCA	C CHIP CERA	50V CH 470PF J 2012		RC405	HRFT562JCA	R CHIP	1/10 5.6K OHM J 2012
CC606	HCQK471JCA	C CHIP CERA	50V CH 470PF J 2012		RC406	HRFT562JCA	R CHIP	1/10 5.6K OHM J 2012
CC610	HCQK181JCA	C CHIP CERA	50V CH 180PF J 2012		RC408	HRFT103JCA	R CHIP	1/10 10K OHM J 2012
CC612	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012		RC419	HRFT152JCA	R CHIP	1/10 1.5K OHM J 2012
CC613	HCFK103ZCA	C CHIP CERA	50V Y5V 0.01MF Z 2012		RC420	HRFT394JCA	R CHIP	1/10 390K OHM J 2012
CC701	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012		RC501	HRFT750JCA	R CHIP	1/10 75 OHM J 2012
CC702	HCQK820JCA	C CHIP CERA	50V CH 82PF J 2012		RC503	HRFT750JCA	R CHIP	1/10 75 OHM J 2012
CC705	HCBK472KCA	C CHIP CERA	50V X7R 4700PF K 2012		RC504	HRFT750JCA	R CHIP	1/10 75 OHM J 2012
CC707	HCQK820JCA	C CHIP CERA	50V CH 82PF J 2012		RC505	HRFT750JCA	R CHIP	1/10 75 OHM J 2012
CC708	HCBK472KCA	C CHIP CERA	50V X7R 4700PF K 2012		RC506	HRFT101JCA	R CHIP	1/10 100 OHM J 2012

ELECTRICAL PARTS LIST

RC507	HRFT103JCA	R CHIP	1/10 10K OHM J 2012		RC712	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RC508	HRFT103JCA	R CHIP	1/10 10K OHM J 2012		RC713	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RC509	HRFT102JCA	R CHIP	1/10 1K OHM J 2012		RC714	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RC510	HRFT102JCA	R CHIP	1/10 1K OHM J 2012		RC715	HRFT152JCA	R CHIP	1/10 1.5K OHM J 2012
RC511	HRFT470JCA	R CHIP	1/10 47 OHM J 2012		RC716	HRFT392JCA	R CHIP	1/10 3.9K OHM J 2012
RC512	HRFT223JCA	R CHIP	1/10 22K OHM J 2012		RC717	HRFT153JCA	R CHIP	1/10 15K OHM J 2012
RC513	HRFT103JCA	R CHIP	1/10 10K OHM J 2012		RC719	HRFT332JCA	R CHIP	1/10 3.3K OHM J 2012
RC514	HRFT151JCA	R CHIP	1/10 150 OHM J 2012		RC720	HRFT271JCA	R CHIP	1/10 270 OHM J 2012
RC515	HRFT000-CA	R CHIP	1/10 0 OHM 2012		RC721	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RC516	HRFT102JCA	R CHIP	1/10 1K OHM J 2012		RC722	HRFT332JCA	R CHIP	1/10 3.3K OHM J 2012
RC517	HRFT102JCA	R CHIP	1/10 1K OHM J 2012		RC723	HRFT624JCA	R CHIP	1/10 620K OHM J 2012
RC518	HRFT101JCA	R CHIP	1/10 100 OHM J 2012		RC725	HRFT471JCA	R CHIP	1/10 470 OHM J 2012
RC519	HRFT101JCA	R CHIP	1/10 100 OHM J 2012		RC726	HRFT103JCA	R CHIP	1/10 10K OHM J 2012
RC520	HRFT103JCA	R CHIP	1/10 10K OHM J 2012		RC727	HRFT103JCA	R CHIP	1/10 10K OHM J 2012
RC521	HRFT363JCA	R CHIP	1/10 36K OHM J 2012		RC729	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RC522	HRFT222JCA	R CHIP	1/10 2.2K OHM J 2012		RC730	HRFT332JCA	R CHIP	1/10 3.3K OHM J 2012
RC523	HRFT822JCA	R CHIP	1/10 8.2K OHM J 2012		RC731	HRFT100JCA	R CHIP	1/10 10 OHM J 2012
RC524	HRFT103JCA	R CHIP	1/10 10K OHM J 2012		RC732	HRFT000-CA	R CHIP	1/10 0 OHM 2012
RC525	HRFT153JCA	R CHIP	1/10 15K OHM J 2012		RC733	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RC526	HRFT273JCA	R CHIP	1/10 27K OHM J 2012		RC736	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RC527	HRFT473JCA	R CHIP	1/10 47K OHM J 2012		RC738	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RC528	HRFT221JCA	R CHIP	1/10 220 OHM J 2012		RC751	HRFT103JCA	R CHIP	1/10 10K OHM J 2012
RC529	HRFT271JCA	R CHIP	1/10 270 OHM J 2012		RC752	HRFT682JCA	R CHIP	1/10 6.8K OHM J 2012
RC530	HRFT271JCA	R CHIP	1/10 270 OHM J 2012		RC754	HRFT333JCA	R CHIP	1/10 33K OHM J 2012
RC531	HRFT271JCA	R CHIP	1/10 270 OHM J 2012		RC755	HRFT473JCA	R CHIP	1/10 47K OHM J 2012
RC532	HRFT333JCA	R CHIP	1/10 33K OHM J 2012		RC822	HRFT273JCA	R CHIP	1/10 27K OHM J 2012
RC534	HRFT334JCA	R CHIP	1/10 330K OHM J 2012		RC828	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RC535	HRFT184JCA	R CHIP	1/10 180K OHM J 2012		RC829	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RC537	HRFT103JCA	R CHIP	1/10 10K OHM J 2012		RC901	HRFT272JCA	R CHIP	1/10 2.7K OHM J 2012
RC538	HRFT223JCA	R CHIP	1/10 22K OHM J 2012		RC902	HRFT302JCA	R CHIP	1/10 3K OHM J 2012
RC539	HRFT122JCA	R CHIP	1/10 1.2K OHM J 2012		RC903	HRFT302JCA	R CHIP	1/10 3K OHM J 2012
RC541	HRFT222JCA	R CHIP	1/10 2.2K OHM J 2012		RC904	HRFT302JCA	R CHIP	1/10 3K OHM J 2012
RC542	HRFT222JCA	R CHIP	1/10 2.2K OHM J 2012		RC905	HRFT272JCA	R CHIP	1/10 2.7K OHM J 2012
RC543	HRFT222JCA	R CHIP	1/10 2.2K OHM J 2012		RC906	HRFT272JCA	R CHIP	1/10 2.7K OHM J 2012
RC553	HRFT102JCA	R CHIP	1/10 1K OHM J 2012		RC907	HRFT272JCA	R CHIP	1/10 2.7K OHM J 2012
RC555	HRFT101JCA	R CHIP	1/10 100 OHM J 2012		ZZ200	PTMPJ0D318	PCB MAIN (RHU) AS	DTP-21V4TF
RC560	HRFT472JCA	R CHIP	1/10 4.7K OHM J 2012		C103	CEXF1C222V	C ELECTRO	16V RSS 2200MF (13X25) TP
RC605	HRFT153JCA	R CHIP	1/10 15K OHM J 2012		C301	CEXF1V471C	C ELECTRO	35V RUS 470MF (10X20) TP
RC606	HRFT153JCA	R CHIP	1/10 15K OHM J 2012		C302	CCXB3A471K	C CERA	1KV B 470PF K (T)
RC610	HRFT102JCA	R CHIP	1/10 1K OHM J 2012		C303	CEXF1E102V	C ELECTRO	25V RSS 1000MF (13X20) TP
RC611	HRFT152JCA	R CHIP	1/10 1.5K OHM J 2012		C305	CMXE2A473J	C MYLAR	100V PU 0.047MF J
RC620	HRFT101JCA	R CHIP	1/10 100 OHM J 2012		C405	CCXB3D271K	C CERA	2KV B 270PF K (T)
RC621	HRFT104JCA	R CHIP	1/10 100K OHM J 2012		C421	CEXF2E330V	C ELECTRO	250V RSS 33MF (13X25) TP
RC623	HRFT103JCA	R CHIP	1/10 10K OHM J 2012		C606	CEXF1C471V	C ELECTRO	16V RSS 470MF (10X12.5)TP
RC630	HRFT102JCA	R CHIP	1/10 1K OHM J 2012		C704	CEXF1C102V	C ELECTRO	16V RSS 1000MF (10X20) TP
RC702	HRFT102JCA	R CHIP	1/10 1K OHM J 2012		C815	CEXF2C101V	C ELECTRO	160V RSS 100MF (16X25) TP
RC703	HRFT102JCA	R CHIP	1/10 1K OHM J 2012		C818	CEXF2C101V	C ELECTRO	160V RSS 100MF (16X25) TP
RC704	HRFT562JCA	R CHIP	1/10 5.6K OHM J 2012		C820	CEXF1E102V	C ELECTRO	25V RSS 1000MF (13X20) TP
RC705	HRFT153JCA	R CHIP	1/10 15K OHM J 2012		C827	CEXF1C222V	C ELECTRO	16V RSS 2200MF (13X25) TP
RC706	HRFT562JCA	R CHIP	1/10 5.6K OHM J 2012		C830	CEXF1C471V	C ELECTRO	16V RSS 470MF (10X12.5)TP
RC707	HRFT101JCA	R CHIP	1/10 100 OHM J 2012		C906	CBXB3D102K	C CERA SEMI	2KV BL(N) 1000PF K (T)
RC708	HRFT102JCA	R CHIP	1/10 1K OHM J 2012		△L800	58Q0000093	COIL DELAY LINE	RS208
RC709	HRFT222JCA	R CHIP	1/10 2.2K OHM J 2012		ZZ200	PTMPJB0D318	PCB MAIN M-10 AS	DTP-21V4TF
RC710	HRFT222JCA	R CHIP	1/10 2.2K OHM J 2012		10	2TM18006BE	TAPE MASKING	6.2X500
RC711	HRFT222JCA	R CHIP	1/10 2.2K OHM J 2012		P101	485923162S	CONN WAFER	YW025-03 (STICK)

ELECTRICAL PARTS LIST

P601	485923162S	CONN WAFER	YW025-03 (STICK)		C905	CMXL2E104K	C MYLAR	250V MEU 0.1MF K
R402	RS02Z103JS	R M-OXIDE FILM	2W 10K OHM J SMALL		F801A	4857415001	CLIP FUSE	PFC5000-0702
R403	RS01Z479J-	R M-OXIDE FILM	1W 4.7 OHM J (TAPPING)		F801B	4857415001	CLIP FUSE	PFC5000-0702
R808	RS02Z828JS	R M-OXIDE FILM	2W 0.82 OHM J SMALL		Q105	TKTC3198Y-	TR	KTC3198Y
R819	RS02Z278JS	R M-OXIDE FILM	2W 0.27 OHM J SMALL		Q401	TKTC3207--	TR	KTC3207 (TP)
ZZ200	PTMPJRD318	PCB MAIN RADIAL AS	DTP-21V4TF		Q501	TKTC3198Y-	TR	KTC3198Y
C101	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP		Q502	TKTC3198Y-	TR	KTC3198Y
C102	CEXF1H479V	C ELECTRO	50V RSS 4.7MF (5X11) TP		Q503	TKTA1266Y-	TR	KTA1266Y (TP)
C304	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP		Q505	TKTA1266Y-	TR	KTA1266Y (TP)
C306	CEXF1V101C	C ELECTRO	35V RUS 100MF (8X11.5) TP		Q506	TKTC3198Y-	TR	KTC3198Y
C307	CMXB1H224J	C MYLAR	50V EU 0.22MF J (TP)		Q601	TKTC3198Y-	TR	KTC3198Y
C313	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP		Q620	TKTA1266Y-	TR	KTA1266Y (TP)
C402	CEXF2C109V	C ELECTRO	160V RSS 1MF (6.3X11) TP		Q701	TKTA1266Y-	TR	KTA1266Y (TP)
C406	CCXB2H102K	C CERA	500V B 1000PF K (TAPPING)		Q702	TKTC3198Y-	TR	KTC3198Y
C410	CMXM2A104J	C MYLAR	100V 0.1MF J (TP)		Q703	TKTC3198Y-	TR	KTC3198Y
C420	CEXF1C470V	C ELECTRO	16V RSS 47MF (5X11) TP		Q704	TKTC3198Y-	TR	KTC3198Y
C501	CEXF1H478V	C ELECTRO	50V RSS 0.47MF (5X11) TP		Q705	TKTC3198Y-	TR	KTC3198Y
C502	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP		Q710	TKTC3198Y-	TR	KTC3198Y
C503	CEXF1C470V	C ELECTRO	16V RSS 47MF (5X11) TP		Q802	TKSA1013Y-	TR	KSA1013Y (TP)
C504	CEXD1H229F	C ELECTRO	50V RND 2.2MF (5X11) TP		R302	RN02B229JS	R METAL FILM	2W 2.2 OHM J SMALL
C506	CEXD1H229F	C ELECTRO	50V RND 2.2MF (5X11) TP		R303	RN02B271JS	R METAL FILM	2W 270 OHM J SMALL
C507	CEXF1C101V	C ELECTRO	16V RSS 100MF (6.3X11) TP		R307	RN02B910JS	R METAL FILM	2W 91 OHM J SMALL
C511	CEXF1C470V	C ELECTRO	16V RSS 47MF (5X11) TP		R308	RN02B910JS	R METAL FILM	2W 91 OHM J SMALL
C512	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP		R309	RN02B910JS	R METAL FILM	2W 91 OHM J SMALL
C513	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP		R310	RN02B910JS	R METAL FILM	2W 91 OHM J SMALL
C514	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP		R401	RN02B332JS	R METAL FILM	2W 3.3K OHM J SMALL
C515	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP		R404	RN02B332JS	R METAL FILM	2W 3.3K OHM J SMALL
C516	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP		R410	RN01B132JS	R METAL FILM	1W 1.3K OHM J SMALL
C517	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP		R503	RN01B300JS	R METAL FILM	1W 30 OHM J SMALL
C520	CEXF1C470V	C ELECTRO	16V RSS 47MF (5X11) TP		R850	RN02B180JS	R METAL FILM	2W 18 OHM J SMALL
C522	CEXF1C470V	C ELECTRO	16V RSS 47MF (5X11) TP		R901	RN01B124JS	R METAL FILM	1W 120K OHM J SMALL
C523	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP		R902	RN01B124JS	R METAL FILM	1W 120K OHM J SMALL
C524	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP		R903	RN01B124JS	R METAL FILM	1W 120K OHM J SMALL
C601	CEXF1C470V	C ELECTRO	16V RSS 47MF (5X11) TP		SW701	5S50101090	SW TACT	SKHV17910A
C602	CEXF1H108V	C ELECTRO	50V RSS 0.1MF (5X11) TP		SW702	5S50101090	SW TACT	SKHV17910A
C611	CEXF1C470V	C ELECTRO	16V RSS 47MF (5X11) TP		SW703	5S50101090	SW TACT	SKHV17910A
C620	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP		SW704	5S50101090	SW TACT	SKHV17910A
C702	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP		SW705	5S50101090	SW TACT	SKHV17910A
C703	CEXF1C470V	C ELECTRO	16V RSS 47MF (5X11) TP		X501	5XEX4R433B	CRYSTAL QUARTZ	HC-49U 4.43361M 15PPM TP
C706	CEXF1H478V	C ELECTRO	50V RSS 0.47MF (5X11) TP		X502	5XEX3R579B	CRYSTAL QUARTZ	HC-49U 3.57954M 15PPM TP
C803	CCXF3A472Z	C CERA	1KV F 4700PF Z (T)		X701	5XEX4R000C	CRYSTAL QUARTZ	HC-49U 4.0000MHZ (TP)
C804	CCXF3A472Z	C CERA	1KV F 4700PF Z (T)		ZZ200	PTMPJAD318	PCB MAIN AXIAL AS	DTP-21V4TF
C816	CCXB3A471K	C CERA	1KV B 470PF K (T)		10	2TM14006LB	TAPE MASKING	3M #232 6.0X2000M
C819	CEXF2A100C	C ELECTRO	RUS 100V 10MF 5*11		20	2TM10006LB	TAPE MASKING	3M #232-MAP-C 6.2X2000M
C822	CEXF1C101V	C ELECTRO	16V RSS 100MF (6.3X11) TP		A001	4859803593	PCB MAIN	246X246 D1B
C823	CCXB3A471K	C CERA	1KV B 470PF K (T)		D101	D1N4148---	DIODE	1N4148 (TAPPING)
C824	CCXB3A471K	C CERA	1KV B 470PF K (T)		D103	D1SS85TA--	DIODE	1SS85TA
C825	CEXF1H220V	C ELECTRO	50V RSS 22MF (5X11) TP		D105	DUZ33B----	DIODE ZENER	UZ-33B
C826	CEXF1H479V	C ELECTRO	50V RSS 4.7MF (5X11) TP		D106	D1N4148---	DIODE	1N4148 (TAPPING)
C828	CEXF1C101V	C ELECTRO	16V RSS 100MF (6.3X11) TP		D107	DUZ5R1B---	DIODE ZENER	UZ-5.1B UNIZON
C829	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP		D301	NBYD33GT--	DIODE	BYD33G-T
C841	CCXF1H103Z	C CERA	50V F 0.01MF Z (TAPPING)		D303	NBYD33GT--	DIODE	BYD33G-T
C842	CCXB3A102K	C CERA	1KV B 1000PF K (TAPPING)		D402	NBYD33GT--	DIODE	BYD33G-T
C850	CEXF1C470V	C ELECTRO	16V RSS 47MF (5X11) TP		D403	NBYD33GT--	DIODE	BYD33G-T
C902	CMXL2E104K	C MYLAR	250V MEU 0.1MF K		D410	DUZ5R1B---	DIODE ZENER	UZ-5.1B UNIZON

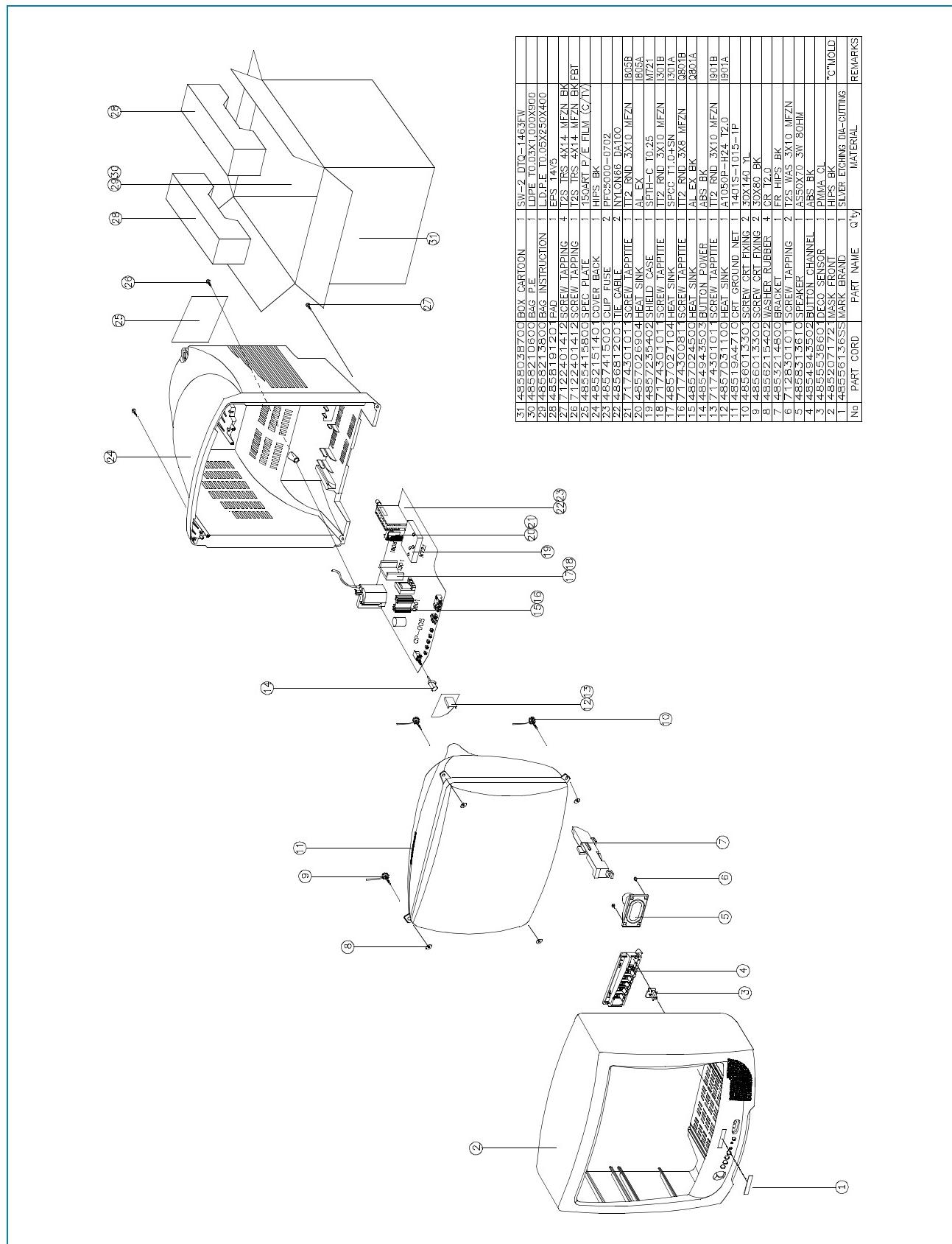
ELECTRICAL PARTS LIST

ELECTRICAL PARTS LIST

J091	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R301	RD-2Z249J-	R CARBON FILM	1/2 2.4 OHM J
J092	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R406	RD-2Z472J-	R CARBON FILM	1/2 4.7K OHM J
J093	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R407	RD-4Z102J-	R CARBON FILM	1/4 1K OHM J
J094	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R408	RD-4Z102J-	R CARBON FILM	1/4 1K OHM J
J095	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R409	RD-4Z561J-	R CARBON FILM	1/4 560 OHM J
J096	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R501	RD-4Z101J-	R CARBON FILM	1/4 100 OHM J
J097	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R502	RD-4Z101J-	R CARBON FILM	1/4 100 OHM J
J098	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R512	RD-4Z750J-	R CARBON FILM	1/4 75 OHM J
J099	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R521	RD-4Z101J-	R CARBON FILM	1/4 100 OHM J
J100	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R525	RD-4Z104J-	R CARBON FILM	1/4 100K OHM J
J104	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R526	RD-4Z102J-	R CARBON FILM	1/4 1K OHM J
J105	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R532	RD-4Z101J-	R CARBON FILM	1/4 100 OHM J
J108	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R601	RD-2Z102J-	R CARBON FILM	1/2 1K OHM J
J109	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R602	RD-4Z471J-	R CARBON FILM	1/4 470 OHM J
J110	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R611	RD-4Z362J-	R CARBON FILM	1/4 3.6K OHM J
J111	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R715	RD-4Z102J-	R CARBON FILM	1/4 1K OHM J
J112	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R723	RD-4Z332J-	R CARBON FILM	1/4 3.3K OHM J
J113	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R735	RD-4Z103J-	R CARBON FILM	1/4 10K OHM J
J114	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R736	RD-4Z224J-	R CARBON FILM	1/4 220K OHM J
J115	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R753	RD-4Z473J-	R CARBON FILM	1/4 47K OHM J
J116	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R803	RD-4Z514J-	R CARBON FILM	1/4 510K OHM J
J117	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R804	RD-4Z514J-	R CARBON FILM	1/4 510K OHM J
J118	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R805	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING
J119	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R806	RD-4Z363J-	R CARBON FILM	1/4 36K OHM J
J120	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R809	RD-4Z363J-	R CARBON FILM	1/4 36K OHM J
J121	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R810	RD-4Z333J-	R CARBON FILM	1/4 33K OHM J
J122	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R812	RC-2Z825KP	R CARBON COMP	1/2 8.2M OHM K
J123	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R823	RD-4Z101J-	R CARBON FILM	1/4 100 OHM J
J124	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R824	RD-4Z101J-	R CARBON FILM	1/4 100 OHM J
J125	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R834	RD-4Z392J-	R CARBON FILM	1/4 3.9K OHM J
J127	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R890	RC-2Z335KP	R CARBON COMP	1/2 3.3M OHM K
J128	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R910	RD-2Z152J-	R CARBON FILM	1/2 1.5K OHM J
J129	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R911	RD-2Z152J-	R CARBON FILM	1/2 1.5K OHM J
J130	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	R912	RD-2Z152J-	R CARBON FILM	1/2 1.5K OHM J
J133	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING				
J134	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING				
J135	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING				
J136	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING				
L301	5CPZ100K04	COIL PEAKING	10UH 10.5MM K (LAL04TB)				
L511	5CPZ100K02	COIL PEAKING	10UH K (AXIAL 3.5MM)				
L601	5CPZ109M02	COIL PEAKING	1UH M (AXIAL 3.5MM)				
L602	5CPZ109M02	COIL PEAKING	1UH M (AXIAL 3.5MM)				
L603	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING				
L604	5CPZ109M02	COIL PEAKING	1UH M (AXIAL 3.5MM)				
L606	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING				
L701	5CPZ100K02	COIL PEAKING	10UH K (AXIAL 3.5MM)				
L702	5CPZ569K02	COIL PEAKING	5.6UH K (AXIAL 3.5MM)				
L802	5MC0000100	COIL BEAD	HC-3550				
L803	5MC0000100	COIL BEAD	HC-3550				
L806	5CPZ390K04	COIL PEAKING	39UH 10.5MM K (LAL04TB)				
R101	RD-4Z242J-	R CARBON FILM	1/4 2.4K OHM J				
R109	RD-4Z183J-	R CARBON FILM	1/4 18K OHM J				
R110	RD-4Z102J-	R CARBON FILM	1/4 1K OHM J				
R111	RD-4Z101J-	R CARBON FILM	1/4 100 OHM J				
R120	RD-4Z101J-	R CARBON FILM	1/4 100 OHM J				

Mechanical Exploded View

11



Important Service Notes

1. X-ray Radiation Recaution

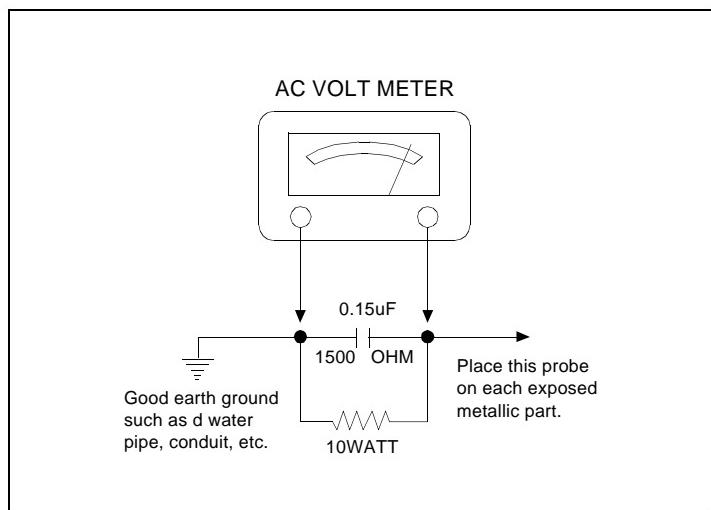
- 1) Excessive high voltage can produce potentially hazardous X-RAY RADIATION. To avoid such hazards, the high voltage must not be above the specified limit. The nominal value of the high voltage of this receiver is 25.5kv(20"/21") & 23.5kv(14") at zero beam current (minimum brightness) under a 120V/220V AC power source. The high voltage must not, under any circumstances, exceed 28kv(20"/21") & 26kv(14"). Each time a receiver requires servicing, the high voltage should be checked following the HIGH VOLTAGE CHECK procedure on page 10 of this manual. It is recommended as a parts of the service record. It is important to use an accurate and reliable high voltage meter.
- 2) This receiver is equipped with X-RADIATION PROTECTION circuit which prevents the receiver from producing an excessively high voltage even if the B+ voltage increases abnormally. Each time the receiver is serviced, X-RADIATION PROTECTION circuit must be checked to determine that the circuit is properly functioning, following the X-RADIATION PROTECTION CIRCUIT CHECK procedure on page 6 of this manual.
- 3) The only source of X-RAY RADIATION in this TV receiver is the picture tube. For continued X-RAY RADIATION protection, the replacement tube must be exactly the same type tube as specified in the parts list.
- 4) Some parts in this receiver have special safety-related characteristics for X-RAY RADIATION protection. For continued safety, parts replacement should be undertaken only after referring to the PRODUCT SAFETY NOTICE below.

2. Safety Precaution

WARNING: Service should not be attempted by anyone unfamiliar with the necessary precaution on this receiver. The following are the necessary precaution to be observed before servicing.

- 1) Since the chassis of this receiver has hazardous potential to ground whenever the receiver is plugged in (floating chassis), an isolation transformer must be used during servicing to avoid shock hazard.
- 2) Always discharge the picture tube anode to the CRT conductive coating the picture tube. The picture tube is highly evacuated and if broken, glass fragments will be violently expelled. Use shatterproof goggles and keep picture tube away from the body while handling.
- 3) When placing chassis in the cabinet, always be certain that all the protective devices are put back in place, such as; nonmetallic control knobs, insulating covers, shields, isolation resistor-capacitor network, etc.
- 4) Before returning the set to the customer, always perform an AC leakage current check on the exposed metallic parts of the cabinet, such as antennas, terminals, screw-heads, metal overlays, control shafts etc. to be sure the set is safe to operate without danger of electrical shock. Plug the AC line cord directly into a 120V AC outlet (do not use a line isolation transformer during this check). Use an AC voltmeter having 5000 ohms per volt or more sensitivity in the following manner.

Connect at 1500 ohm 10 watt resistor, paralleled by a 0.15 mfd. AC type capacitor, between a known good earth ground (water pipe, conduit etc.) and the exposed metallic parts, one at a time. Measure the AC voltage across the combination of 1500 ohm resistor and 0.15 mfd capacitor. Voltage measured must not exceed 0.3 volts RMS. This corresponds to 0.2 milliamp. AC. Any value exceeding the limit constitutes a potential shock hazard and must be corrected immediately.



3. Product Safety Notice

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this manual and its supplements; electrical components having such features are identified by shading on the schematic diagram and the parts list. Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts which do not have the same safety characteristics as specified in the parts list may create X-ray radiation or other hazards.

4. Service Notes

- 1) When replacing parts or circuit boards, clamp or bend the lead wires to terminals before soldering.
- 2) When replacing a high wattage resistor (metal oxide film resistor) in the circuit board, keep the resistor min 1/2 inch away from circuit board.
- 3) Keep wires away from high voltage or high temperature components.

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Alignment Instructions

SVC v0	
R BIAS	159
G BIAS	136
B BIAS	127
R DRIVE	35
G DRIVE	31
B DRIVE	32
V. CENTER	10
V. SIZE	23
H. CENTER	28
VCO	07
VCO FIN	107
VCO-L	05
VCO-L FIN	113
AGC	NO
LED EAST	44
Pr	01

ENTER SERVICE MODE

1. Select the Pr 91.
2. Adjust "Sparness" to 0.
3. Enter the service mode using the follow keys.
R → G → MENU.

2. SCREEN

- 1) Receive the Retma pattern and heat run over 15minutes.
- 2) Adjust the 'R, G BIAS, R, G DRIVE' to 0, 'B BIAS' to 127, 'B DRIVE' to 32.
Adjust the screen volume that the Retma pattern reaches the cut-off point.

3. WHITE BALANCE

- 1) Receive the Full white pattern and heat run over 15minutes.
- 2) Adjust the picture control at the point 'X' value of white balance instrument in 20cd/m
- 3) Enter the service mode.
- 4) Adjust 'R BIAS, G BIAS' to x=288, y=301.
- 5) In order to exit the service mode power off the TV set and power on.
- 6) Set the TV set to 'Normal I' mode(20/21 inch) or set to 'Normal II' mode(14 inch)
- 7) Enter the service mode.
- 8) Adjust 'R DRIVE, G DRIVE' to x=288, y=301.
- 9) Repeat above process until the white balance value to x=288, y=301, X=20, x=288, y=301, X=200 (approximate) in 2) -8).

1. AFT

- 1) Set a signal Generator with
 - RF FREQUENCY = 38.9MHz, 34.2MHz (L)
 - RF OUTPUT LEVEL = 80+/-5dBuV
 - System = PAL for 38.9MHz.
SECAM-I for 43.2MHz.
- 2) Connect the Signal Generator RF Output (PAL 38.9MHz) to P101 (Tuner IF Output). There must be no signal input to the tuner.
- 3) Locate the cursor to 'VCO' in Service Mode Menu, then press the "Vol +" key and wait until the 'Please wait' disappear on the TV screen.
- 4) Connect the Signal Generator RF Output (SECAM-L 34.2MHz) to P101 (Tuner IF Output).
- 5) Locate the cursor to 'VCO-L' in Service Mode Menu, then press the "Vol +" key and wait until the 'Please wait' disappear on the TV screen.

4. FOCUS

- 1) Apply a RETMA PATTERN signal.
- 2) Adjust the Focus Volume on FBT to obtain optimal resolution.

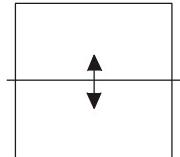
5. AGC

- 1) Set a pattern Generator with
 - RF LEVEL = 60dBuV
 - 100% FULL COLOR BAR
- 2) Connect the Pattern Generator RF Output to tuner RF input.
- 3) Connect the probe of oscilloscope in AGC pin of tuner.
- 4) Adjust the AGC point to MAX - 1V.
(Simple Method)
 - 1) Receive the pattern.
 - 2) Locate the cursor in "AGC" and adjust using the "VOL +" or "VOL -" keys.
 - 3) Adjust the point there is no noise in about 60dBuV and no beat in about 90dBuV.

6. GEOMETRY

6.1 VERTICAL CENTER

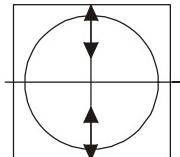
- 1) Set the TV to 'NORMAL I' mode.
- 2) Enter the service mode.
- 3) Locate the cursor at "V.CENTER" then press "VOL +"
or "VOL -" keys to adjust the center line with the
mechanical center marks of the CRT.



6.2 VERTICAL SIZE

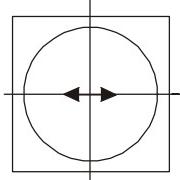
* The VERTICAL CENTER adjustment has to be done in advance.

- 1) Receive the Retma pattern.
- 2) Set the TV to 'NORMAL I' mode.
- 3) Enter the service mode.
- 4) Locate the cursor at "V.SIZE" then press "VOL +"
or "VOL -" keys to adjust the upper part of the picture.



6.3 HORIZONTAL CENTER

- 1) Apply a RETMA PATTERN signal.
- 2) Set the TV to 'NORMAL I' mode.
- 3) Enter the service mode.
- 4) Locate the cursor at "H.CENTER" then press "VOL +"
or "VOL -" keys to adjust the picture centering.



if EEPROM(I702) has been changed;

- Option data has to be change and
- all alignment function has to be readjusted

* The initial state of adjustment are as follows;
- V-Center, V-Size, H-Center, R, G, B, AFT = Center ()
- AGC =

* Service Remocon

Electrical Parts List

Ⓐ is a recommendable part for stock.

△ is safety component, so it must be used the same component.

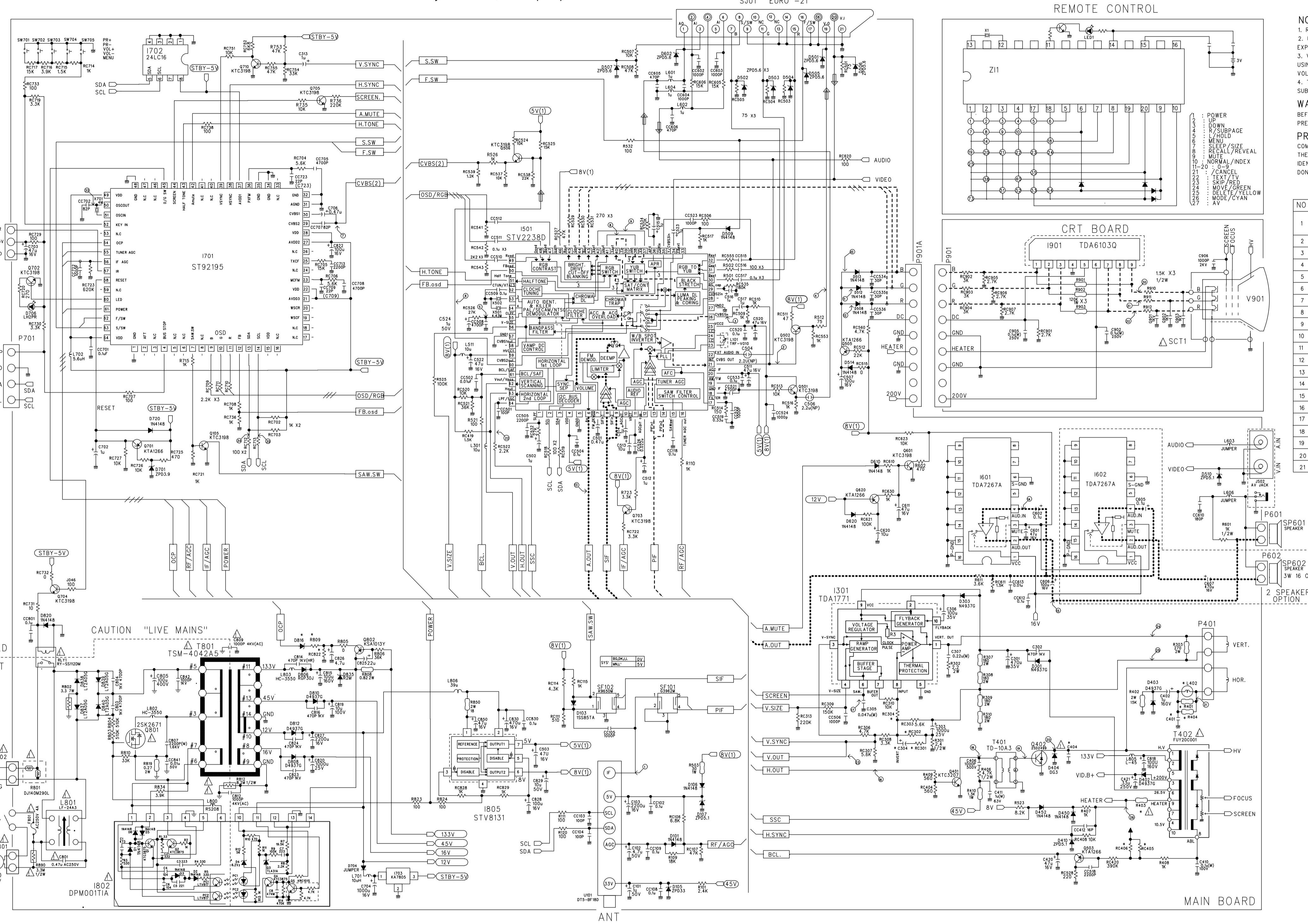
LOC	PART CODE	PART NAME	PART DESCRIPTION
ZZ100 Ⓢ	48B3740A01	TRANSMITTER REMOCON	R-40A01
ZZ110	PTACPWA627	ACCESSORY AS	DTP-14C5TF
100	4850Q00910	BATTERY	R03/NN
M821	4858213800	BAG INSTRUCTION	L.D.P.E T0.05X250X400
ZZ120 Ⓢ	PTBCSHA627	COVER BACK AS	DTP-14C5TF
M211	4852151401	COVER BACK	HIPS BK
M541	4855415800	SPEC PLATE	150ART P/E FILM (C/TV)
ZZ130	PTPKCPA627	PACKING AS	DTP-14C5TF
M801	4858038700	BOX CARTON	SW-2 DTO-1463FW
M811	4858189600	PAD	EPS 14V5
M821	4858210600	BAG P.E	L.D.P.E T0.03X1000X900
ZZ131	48519A4710	CRT GROUND NET	1401S-1015-1P
ZZ132	58G0000084	COIL DEGAUSSING	DC-1450
ZZ140	PTCACAA627	CABINET AS	DTP-14C5TF
CRT1 Ⓢ	PTRTRPWA605	CRT AS	PAL 14" ITC CRT AS
V01	58D0000082	COIL DY	ODY-M1489
V02	48A96R004-	RUBBER WEDGE	HMR 28 SR (0X54)
V03	4850PM001-	MAGNET CP	NY-225 (MINI NECK)
V04	2TC26019BE	TAPE CLOTH	19X30 BEIGE
V05	2224050026	BOND SILICON	RTV 122 CARTRIDGE
V06	2233030001	PAINT LOCK	3B-1401B
V901	48A96414P4	CRT BARE	A34JLL90X(K)
M193 Ⓢ	4851937902	BUTTON CTRL	4942102+5537501
M321	4853214800	BRKT	FR HIPS BK
M491B Ⓢ	4854942103	BUTTON	ABS BK
M561	4855621401	MARK BRAND	ABS BK
M681	4856812001	TIE CABLE	NYLON66 DA100
SP01A	7178301011	SCREW TAPPTITE	TT2 WAS 3X10 MFZN
ZZ200 Ⓢ	PTFMSJA627	MASK FRONT AS	DTP-14C5TF
M201	4852069901	MASK FRONT	HIPS BK
ZZ210 Ⓢ	PTSPPPWA627	SPEAKER AS	DTP-14C5TF
P601A	4850703S50	CONNECTOR	YH025- 03+35098+ULW=200
SP01 Ⓢ	4858314010	SPEAKER	SP-5070F01 3W 8 OHM
ZZ290 Ⓢ	PTMPMSA627	PCB MAIN MANUAL AS	DTP-14C5TF
C101	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP
C102	CEXF1H479V	C ELECTRO	50V RSS 4.7MF (5X11) TP
C103	CEXF1C222V	C ELECTRO	16V RSS 2200MF (13X25) TP
C301	CEXF1V471C	C ELECTRO	35V RUS 470MF (10X20) TP
C302	CCXB3A471K	C CERA	1KV B 470PF K (T)
C303	CEXF1E102C	C ELECTRO	25V RUS 1000MF (13X20) TP
C304	CEXF1H220V	C ELECTRO	50V RSS 22MF (5X11) TP
C305	CMXE2A473J	C MYLAR	100V PU 0.047MF J
C306	CEXF1V101C	C ELECTRO	35V RUS 100MF (8X11.5) TP
C307	CMXB1H224J	C MYLAR	50V EU 0.22MF J (TP)
C313	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP
C401	CMYE2D364J	C MYLAR	200V PU 0.36MF J
C402	CEXF2C109V	C ELECTRO	160V RSS 1MF (6.3X11) TP
C404	CMYH3C692J	C MYLAR	1.6KV BUP 6900PF J
C406	CCXB2H102K	C CERA	500V B 1000PF K (TAPPING)

LOC	PART CODE	PART NAME	PART DESCRIPTION
C410	CMXM2A104J	C MYLAR	100V 0.1MF J (TP)
C411	CMYN1J105K	C MYLAR (MKT)	63V 1MF K (7.5MM)
C420	CEXF1C470V	C ELECTRO	16V RSS 47MF (5X11) TP
C421	CEXF2E330V	C ELECTRO	250V RSS 33MF (13X25) TP
C501	CEXF1H478V	C ELECTRO	50V RSS 0.47MF (5X11) TP
C502	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP
C503	CEXF1C470V	C ELECTRO	16V RSS 47MF (5X11) TP
C504	CEXD1H229F	C ELECTRO	50V RND 2.2MF (5X11) TP
C506	CEXD1H229F	C ELECTRO	50V RND 2.2MF (5X11) TP
C507	CEXF1C101V	C ELECTRO	16V RSS 100MF (6.3X11) TP
C511	CEXF1C470V	C ELECTRO	16V RSS 47MF (5X11) TP
C512	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP
C513-7	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP
C520	CEXF1C470V	C ELECTRO	16V RSS 47MF (5X11) TP
C522	CEXF1C470V	C ELECTRO	16V RSS 47MF (5X11) TP
C523	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP
C524	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP
C601	CEXF1C101V	C ELECTRO	16V RSS 100MF (6.3X11) TP
C602	CEXF1H108A	C ELECTRO	50V RSM 0.1MF 4X7
C606	CEXF1C101V	C ELECTRO	16V RSS 100MF (6.3X11) TP
C611	CEXF1C470V	C ELECTRO	16V RSS 47MF (5X11) TP
C620	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP
C702	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP
C703	CEXF1C470V	C ELECTRO	16V RSS 47MF (5X11) TP
C704	CEXF1C102V	C ELECTRO	16V RSS 1000MF (10X20) TP
C706	CEXF1H478V	C ELECTRO	50V RSS 0.47MF (5X11) TP
C801	CL1JB347K	C LINE ACROSS	AC250V 0.47MF U/C/SNDF/SV
C803	CCXF3A472Z	C CERA	1KV F 4700PF Z (T)
C804	CCXF3A472Z	C CERA	1KV F 4700PF Z (T)
C805	CEYN2G181P	C ELECTRO	400V LHS 180MF (25X35)
C807	CMYU3C222J	C MYLAR	1.6KV BCP 2200PF J
C809	CH1HFE102M	C CERA AC	4.0KV 1000PF E DG
C812	CH1HFE102M	C CERA AC	4.0KV 1000PF E DG
C814	CCYR3A471K	C CERA	1KV R 470PF K 125 DE0705
C815	CEXF2C101V	C ELECTRO	160V RSS 100MF (16X25) TP
C816	CCXB3A471K	C CERA	1KV B 470PF K (T)
C818	CEXF2C101C	C ELECTRO	160V RUS 100MF (16X25) TP
C819	CEXF2A100V	C ELECTRO	100V RSS 10MF (6.3X11) TP
C820	CEXF1E102V	C ELECTRO	25V RSS 1000MF (13X20) TP
C822	CEXF1C101V	C ELECTRO	16V RSS 100MF (6.3X11) TP
C823	CCXB3A471K	C CERA	1KV B 470PF K (T)
C824	CCXB3A471K	C CERA	1KV B 470PF K (T)
C825	CEXF1H220V	C ELECTRO	50V RSS 22MF (5X11) TP
C826	CEXF1H479V	C ELECTRO	50V RSS 4.7MF (5X11) TP
C827	CEXF1C222V	C CERA	16V RSS 2200MF (13X25) TP

LOC	PART CODE	PART NAME	PART DESCRIPTION
D107	DUZ5R1B---	DIODE ZENER	UZ-5.1B UNIZON
D301,3	D1N4937G--	DIODE	1N4937G (TAPPING)
D402-3	D1N4937G--	DIODE	1N4937G (TAPPING)
D404	DDG3-----	DIODE	DG3
D410	DUZ5R1B---	DIODE ZENER	UZ-5.1B UNIZON
D450	D1N4148---	DIODE	1N4148 (TAPPING)
D452	D1N4148---	DIODE	1N4148 (TAPPING)
D501-7	DUZ5R6BM--	DIODE ZENER	UZ-5.6BM(TAPPING)
C828	CEXF1C101V	C ELECTRO	16V RSS 100MF (6.3X11) TP
C829	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP
C830	CEXF1C471V	C ELECTRO	16V RSS 470MF (10X12.5) TP
C841	CCXF1H103Z	C CERA	50V F 0.01MF Z (TAPPING)
C842	CCXB3A102K	C CERA	1KV B 1000PF K (TAPPING)
C850	CEXF1C470V	C ELECTRO	16V RSS 47MF (5X11) TP
C902	CMXL2E104K	C MYLAR	250V MEU 0.1MF K
C905	CMXL2E104K	C MYLAR	250V MEU 0.1MF K
C906	CBXB3D102K	C CERA SEMI	2KV BL(N) 1000PF K (T)
CC102	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012
CC103	HCKQ101JCA	C CHIP CERA	50V CH 100PF J 2012
CC104	HCKQ101JCA	C CHIP CERA	50V CH 100PF J 2012
CC105	HCKQ102JCA	C CHIP CERA	50V CH 1000PF J 2012
CC108	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012
CC109	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012
CC118	HCBK104KCA	C CHIP CERA	50V X7R 0.1MF K 2012
CC412	HCKQ160JCA	C CHIP CERA	50V CH 16PF J 2012
CC501	HCKQ101JCA	C CHIP CERA	50V CH 100PF J 2012
CC502	HCFK103ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012
CC504	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012
CC505	HCBK222KCA	C CHIP CERA	50V X7R 2200PF K 2012
CC506	HCBK472KCA	C CHIP CERA	50V CH 1000PF J 2012
CC508	HCBK472KCA	C CHIP CERA	50V X7R 4700PF K 2012
CC509-12	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012
CC515-7	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012
CC518	HCBK222KCA	C CHIP CERA	50V X7R 2200PF K 2012
CC520	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012
CC521	HCBK472KCA	C CHIP CERA	50V X7R 4700PF K 2012
CC522-4	HCKQ102JCA	C CHIP CERA	50V CH 1000PF J 2012
CC526	HCBK223KCA	C CHIP CERA	50V X7R 0.022MF K 2012
CC53			

LOC	PART CODE	PART NAME	PART DESCRIPTION
RC511	HRFT470JCA	R CHIP	1/10 47 OHM J 2012
RC512	HRFT223JCA	R CHIP	1/10 22K OHM J 2012
RC513	HRFT103JCA	R CHIP	1/10 10K OHM J 2012
RC514	HRFT151JCA	R CHIP	1/10 150 OHM J 2012
RC515	HRFT000-CA	R CHIP	1/10 0 OHM 2012
RC516	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RC517	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RC518	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RC519	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RC520	HRFT103JCA	R CHIP	1/10 10K OHM J 2012
RC521	HRFT363JCA	R CHIP	1/10 36K OHM J 2012
RC522	HRFT222JCA	R CHIP	1/10 2.2K OHM J 2012
RC523	HRFT822JCA	R CHIP	1/10 8.2K OHM J 2012
RC524	HRFT103JCA	R CHIP	1/10 10K OHM J 2012
RC525	HRFT153JCA	R CHIP	1/10 15K OHM J 2012
RC526	HRFT273JCA	R CHIP	1/10 27K OHM J 2012
RC527	HRFT473JCA	R CHIP	1/10 47K OHM J 2012
RC528	HRFT221JCA	R CHIP	1/10 220 OHM J 2012
RC529-31	HRFT271JCA	R CHIP	1/10 270 OHM J 2012
RC532	HRFT273JCA	R CHIP	1/10 27K OHM J 2012
RC534	HRFT334JCA	R CHIP	1/10 330K OHM J 2012
RC535	HRFT184JCA	R CHIP	1/10 180K OHM J 2012
RC537	HRFT103JCA	R CHIP	1/10 10K OHM J 2012
RC538	HRFT223JCA	R CHIP	1/10 22K OHM J 2012
RC539	HRFT122JCA	R CHIP	1/10 1.2K OHM J 2012
RC541-3	HRFT222JCA	R CHIP	1/10 2.2K OHM J 2012
RC553	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RC555	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RC560	HRFT472JCA	R CHIP	1/10 4.7K OHM J 2012
RC605	HRFT153JCA	R CHIP	1/10 15K OHM J 2012
RC606	HRFT153JCA	R CHIP	1/10 15K OHM J 2012
RC610	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RC611	HRFT152JCA	R CHIP	1/10 1.5K OHM J 2012
RC620	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RC621	HRFT104JCA	R CHIP	1/10 100K OHM J 2012
RC623	HRFT512JCA	R CHIP	1/10 5.1K OHM J 2012
RC630	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RC702	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RC703	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RC704	HRFT562JCA	R CHIP	1/10 5.6K OHM J 2012
RC705	HRFT153JCA	R CHIP	1/10 15K OHM J 2012
RC706	HRFT562JCA	R CHIP	1/10 5.6K OHM J 2012
RC707	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RC708	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RC709	HRFT222JCA	R CHIP	1/10 2.2K OHM J 2012
RC710	HRFT222JCA	R CHIP	1/10 2.2K OHM J 2012
RC711	HRFT222JCA	R CHIP	1/10 2.2K OHM J 2012
RC712	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RC713	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RC714	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RC715	HRFT152JCA	R CHIP	1/10 1.5K OHM J 2012
RC716	HRFT392JCA	R CHIP	1/10 3.9K OHM J 2012
RC717	HRFT153JCA	R CHIP	1/10 15K OHM J 2012
RC719	HRFT332JCA	R CHIP	1/10 3.3K OHM J 2012
RC720	HRFT271JCA	R CHIP	1/10 270 OHM J 2012
RC721	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RC722	HRFT332JCA	R CHIP	1/10 3.3K OHM J 2012
RC723	HRFT624JCA	R CHIP	1/10 620K OHM J 2012
RC725	HRFT471JCA	R CHIP	1/10 470 OHM J 2012
LOC	PART CODE	PART NAME	PART DESCRIPTION
RC726	HRFT103JCA	R CHIP	1/10 10K OHM J 2012
RC727	HRFT103JCA	R CHIP	1/10 10K OHM J 2012
RC729	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RC730	HRFT332JCA	R CHIP	1/10 3.3K OHM J 2012
RC731	HRFT100JCA	R CHIP	1/10 10 OHM J 2012
RC732	HRFT000-CA	R CHIP	1/10 0 OHM 2012
RC733	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RC736	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RC738	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RC751	HRFT103JCA	R CHIP	1/10 10K OHM J 2012
RC752	HRFT682JCA	R CHIP	1/10 6.8K OHM J 2012
RC754	HRFT333JCA	R CHIP	1/10 33K OHM J 2012
RC755	HRFT473JCA	R CHIP	1/10 47K OHM J 2012
RC822	HRFT134JCA	R CHIP	1/10 130K OHM J 2012
RC828	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RC829	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RC901	HRFT272JCA	R CHIP	1/10 2.7K OHM J 2012
RC902	HRFT302JCA	R CHIP	1/10 3K OHM J 2012
RC903	HRFT302JCA	R CHIP	1/10 3K OHM J 2012
RC904	HRFT302JCA	R CHIP	1/10 3K OHM J 2012
RC905-7	HRFT272JCA	R CHIP	1/10 2.7K OHM J 2012
RLY1	5SC0101338	SW RELAY	D05D1-O(M)/GJ-SS-105LM
SCT1	4859303430	SOCKET CRT	PCS633A
SF101	5PG3962M-	FILTER SAW	G 3962-M
SF102	5PK9650M-	FILTER SAW	K9650M
SJ01	4859200401	SOCKET RGB	YRS21-R1
SW701	5S50101090	SW TACT	SKHV17910A
SW702	5S50101090	SW TACT	SKHV17910A
SW703	5S50101090	SW TACT	SKHV17910A
SW704	5S50101090	SW TACT	SKHV17910A
SW705	5S50101090	SW TACT	SKHV17910A
SW801	⑧ 5S40101146	SW POWER PUSH	SS-160-7-B
T401	50D10A3---	TRANS DRIVE	TD-10A3
T402	⑧ 50H000202	FBT	FUY20C001
T801	50M4042A5-	TRANS SMPS	TSM-4042A5
U101	⑧ 4859719930	TUNER VARACTOR	DT5-BF18D
W101	4851900130	GROUND TUNER AS	DS-W1015-S
X501	5XEX4R43B	CRYSTAL QUARTZ	HC-49U 4.43361M 15PPM TP
X502	5XEX3R579B	CRYSTAL QUARTZ	HC-49U 3.57954M 15PPM TP
X701	5XEX4R000C	CRYSTAL QUARTZ	HC-49U 4.0000MHZ (TP)

CP-005 CHASSIS SCHEMATIC DIAGRAM
CP-005 by J.D.Park, 2000/06/05



NO
45

- RESISTANCE IS SHOWN IN OHM. K=1000, M=1000000
UNLESS OTHERWISE NOTED IN SCHEMATIC ALL CAPACITOR VALUES ARE
PRESSED IN μ F
VOLTAGES READ WITH "VTVM" FROM POINT INDICATED TO CHASSIS GROUND
USING A COLOR BAR SIGNAL WITH ALL CONTROLS AT NORMAL LINE 230V AC
VOLTAGE READINGS SHOWN ARE NORMAL VALUES AND MAY VARY $\pm 20\%$ EXCEPT H.V
THIS CIRCUIT DIAGRAM IS A STANDARD ONE CIRCUIT PRINTED MAY BE

SUBJECT TO CH.

WARNING:
BEFORE SERVICING THE CHASSIS, READ "X-RAY RADIATION", "SAFETY
CAUTION" AND "PRODUCT SAFETY NOTICE" IN SERVICE MANUAL.

PRODUCT SAFETY NOTE

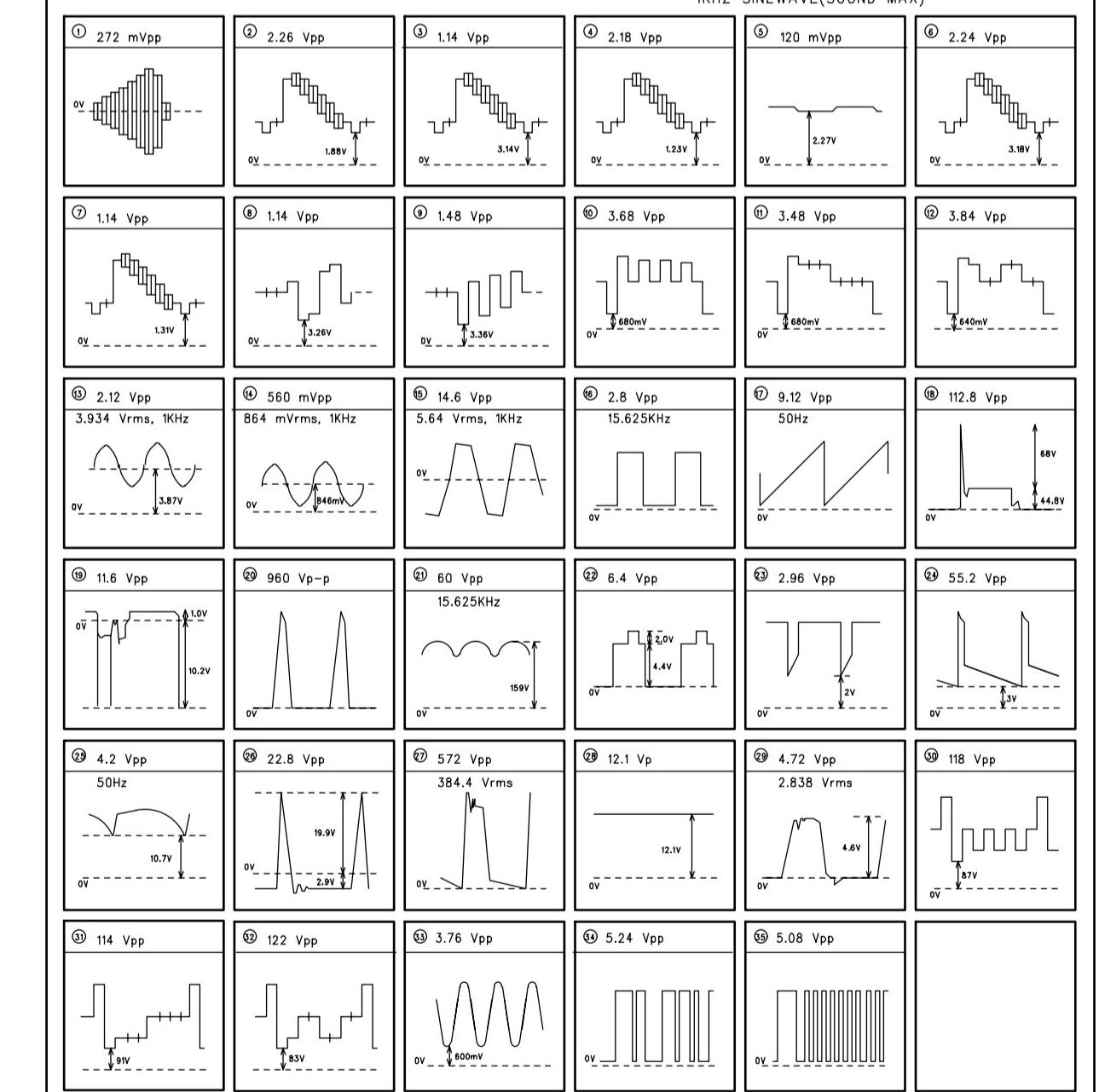
PRODUCT SAFETY NOTE
COMPONENTS MARKED WITH ARE IMPORTANT FOR MAINTAINING THE SAFETY OF THE SET AND SHOULD BE REPLACED ONLY WITH TYPES IDENTICAL TO THOSE IN THE ORIGINAL OR SPECIFIED ONE IN THE PARTS LIST. DON'T DEGRADE THE SAFETY THROUGH IMPROPER SERVICING.

THE DIFFERENT PARTS OF SIZE

LOC	14"			20"			21"		
CRT	ORION	PHILIPS		ORION		POLKOLOR	ORION		PHILIPS
	A34JLL90X			A48JLL90X			A51JSW90X		POLKOLOR
D/Y	ODY-M1489	←		ODY-M2050		←	ODY-L2144	←	←
D/COIL	DC-1450	←		DC-2050		←	DC-2070	←	←
CRT G/A	1401S-	←		2001S-		←	2101S-	←	←
C401	0.36MF 200V	←		0.43MF 200V		←	0.18MF 200V	←	←
C404	6900P 1.6KV	←		6900P 1.6KV		←	6200P 1.6KV	←	←
L402	X	←		X		X	TRL-541B	←	←
R401	X	←		X		X	2W 4.7K	←	←
R404	X	←		X		←	X	←	←
RC301	360	←		360		←	510	←	←
D816	ZPD3.9	←		ZPD10		←	ZPD10	←	←
RC822	130K	←		36K		←	27K	←	←
RC304	2.7K	←		3K		←	3.3K	←	←
P401	YFW500-05	←		YFW500-05		←	YFW500-06	←	←
R809	10K	←		36K		←	36K	←	←
RC405	3.6K	←		3K		←	5.6K	←	←
RC406	X	←		X		←	5.6K	←	←
R403	4.3	←		5.1		←	4.7	←	←
C304	22u	←		22u		←	10u	←	←
RC302	2.0K	←		2.4K		←	2.0K	←	←
J008 .1137	JUMPER	←		JUMPER		←	X	←	←

* WAVEFORM

1. TEST EQUIPMENTS : DIGITAL OSCILLOSCOPE (Tektronix TDX)
 2. TEST CONDITIONS : PAL-B/G FULL COLOR BAR (NORMAL 1
1KHZ SINEWAVE(SOUND MAX))



— — — — Video

— — — — Audio